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Maternal Syphilis in Rural Haiti

Chaylah Joy Lomotey

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Maternal Syphilis in Rural Haiti

Chaylah Joy Lomotey

B.S. Eastern Nazarene College, 2002

A Thesis

Submitted in Partial Fulfillment of the

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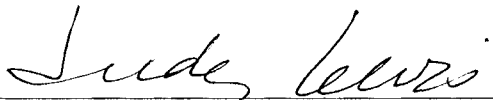
APPROVAL PAGE

Master of Arts Thesis

Maternal Syphilis in Rural Haiti

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Abbreviations

CDC—Centers for Disease Control
COH—Center of Hope
FTA-Abs--Fluorescent Treponemal Antibody Absorption Test
GHEISKIO—"Groupe Haitien d'Étude du Sarcome de Kaposi et des infections Opportunistes" i.e. The Haitian Group for Kaposi's Sarcoma and Opportunistic Infections
HAS—Hospital Albert Schweitzer
HHF—Haitian Health Foundation
IUGR—Intrauterine Growth Retardation
LMP—Last Menstrual Period
KOMBIT—Community Organized for Mothers and Babies with Innovation and Technology
NGO—Non-Governmental Organization
PCN—Penicillin
PHACT—Public Health Active Census Tracking
RPR—Rapid Plasma Reagin
SES—Socioeconomic Status
STD—Sexually Transmitted Disease
TORCH—An acronym for maternal infections that can cause congenital disease
TPHA—Treponema Pallidum Haemagglutination Test
VDRL—Venereal Disease Research Laboratories
WHO—World Health Organization

Introduction

Maternal syphilis is a major problem in the world today. It is not only a problem because of the morbidity and mortality it can cause for a woman herself, but also because it can have serious consequences for her developing infant, including miscarriage, stillbirth, neonatal death, and congenital syphilis. Because of this, there has been a major effort in most of the world to get all pregnant women tested and treated early in pregnancy.

Maternal syphilis is a particularly important issue in the Grand Anse region of Haiti. A seroprevalence study done by the Centers for Disease Control in 2004 showed a prevalence of 7% in this region, and it had been even higher in previous studies (Ministere De La Sante Publique, 2004). This was the highest prevalence in the country of Haiti. The Haitian Health Foundation (HHF) is a non-governmental organization which has maternal-child health as a major focus. It serves over 200,000, some in the town of Jeremie and most from its surrounding villages. One program involves syphilis testing and treatment for all pregnant women at their first prenatal visit. The program has reduced the prevalence of maternal syphilis in the area, but research is needed to understand the causes and effective interventions.

The purpose of this thesis is to provide a broad overview of the problem of maternal syphilis in rural communities in Jeremie, Haiti. It examines available syphilis data including prevalence, sociodemographic characteristics of syphilis positive pregnant women, the relationship between syphilis and adverse pregnancy outcomes, community knowledge about syphilis and the implementation of the HHF syphilis testing and treatment program. This knowledge will be used to direct future program and policy changes as well as future research. This thesis is organized as

such: syphilis background, maternal and congenital syphilis, Haiti background, syphilis in Haiti, background of HHF, methodology, qualitative data, quantitative data, discussion, limitations, and recommendations.

Background

Syphilis: Epidemiology, Risk Factors, Clinical Manifestations, Diagnosis, and Treatment

Syphilis is an ancient disease caused by the spirochete, *Treponema Pallidum*. It is a disease that touches every continent, with an estimated 12 million new cases in the world in 1999. The highest incidence is found in sub-saharan Africa and south and south-east Asia (see figure 1). Syphilis is usually spread via sexual contact or vertical transmission; although there are endemic forms of syphilis that can be spread by non-sexual contact in communities where living conditions are poor. As with most bacterial sexually transmitted infections, venereal syphilis is more common in poor populations who lack access to treatment and in those who have many sexual partners (Peeling et al., 2004).



Figure 1 | **Estimated new cases of syphilis among adults, 1999** (Peeling et al, 2004).

Risk factors for venereal syphilis in pregnancy in some populations include being an unmarried mother, lower socioeconomic status, teenage mother, inadequate prenatal care, multiple sexual partners, sexual contact with a known case of sexually transmitted disease and personal history of other sexually transmitted diseases (Pediatrics OnCall, 2006; Behets et al., 1995).

The clinical manifestations of syphilis are notoriously protean. It has been named “The Great Imitator.” The time frame and constellation of symptoms vary from person to person. The disease is classified as being either early or late, and within these classifications different stages exist. First of all, early syphilis is defined as disease duration of less than one year. It may be primary, secondary, or early latent. Late syphilis is syphilis that occurs after early syphilis, and it may be either tertiary or late latent. It is often difficult to differentiate between early and late syphilis, unless a specific exposure or symptom complex is recalled or there are previous negative test results within the timeframe.

Transmission of *T. Pallidum* is primarily via sexual contact, although it also is transmitted transplacentally and through needle sharing by IV drug users. Endemic syphilis, which is transmitted through casual contact, will be described more in later pages. Following transmission, after an average incubation period of two to three weeks, a painless papule may appear at the site of inoculation. It soon ulcerates to create the classic chancre of primary syphilis (Figures 2 and 3). It is usually a one to two centimeter lesion that is ulcerated and has a raised, indurated margin, and it is often associated with regional adenopathy. These early lesions are highly infective, with 30% transmission rate in those exposed to the lesions. Most chancres are found

on the genitalia, although they can be found in any site that comes into contact with an infectious lesion (e.g. Mouth, anus, skin). Chancres usually heal within three to six weeks even in the absence of treatment. During the stage of primary syphilis, there is wide systemic migration of *T. Pallidum*.



Figure 2. Syphilitic chancre on the penis



Figure 3. Syphilitic chancre on female genitalia

A few weeks or months after the disappearance of the chancre, about 25% of untreated people with primary syphilis will move into the next stage, secondary

syphilis. The remainder will have early latent syphilis, which is asymptomatic. A person who develops secondary syphilis may not have had noticeable primary syphilis and may have been asymptomatic. This is especially true for women. Secondary syphilis is characterized by a systemic spread of the spirochetes and diffuse systemic illness. The wide variety of symptoms can present a diagnostic dilemma and results in many undetected syphilis cases. Rash is the most characteristic symptom. It is usually a maculopapular rash involving the trunk and extremities, including the palms and soles (Figure 4). There may be systemic symptoms, such as fever, headache, anorexia, myalgias, fatigue, sore throat, and weight loss. Most people will have diffuse adenopathy. Other possible findings include alopecia, condyloma lata (highly-infective, large, fleshy lesions involving warm, moist areas), and a variety of neurologic manifestations. If secondary syphilis remains untreated, a person will usually transition into latent syphilis, although some may develop tertiary syphilis.



Figure 4. Palmar-plantar rash of secondary syphilis

Tertiary syphilis is a late occurring stage of the disease. It develops as early as one year after initial infection or up to 25 to 30 years later (Sparling et al., 2006). There are three major manifestations of tertiary syphilis—gummas, cardiovascular complications, and neurosyphilis. Briefly, gummas are granulomatous lesions that may occur anywhere—in skin, bone, or internal organs. Cardiovascular syphilis classically involves dilation of the thoracic aortic root and results in aortic regurgitation. There are many types of neurosyphilis, but the classical form is Tabes Dorsalis, which is involvement of the dorsal horn of the spinal cord with pain and loss of sensation, ataxia, and urinary incontinence.

Latent syphilis is a period when a person is infected with *T. Pallidum*, but is asymptomatic. They will have positive serology. During early latent syphilis, a person remains infectious. However, during late latent syphilis there is virtually no

risk of sexual transmission, though the risk of transplacental transmission remains high.

The diagnosis of syphilis is complicated by the fact that *T. Pallidum* cannot be cultured in vitro. Syphilis can either be identified by direct visualization of the organism from specimens or by serology. Serology is the most widely used diagnostic tool. Direct identification of *T. Pallidum* can be done using darkfield microscopy, fluorescent antibody testing, or polymerase chain reaction. Serologic testing is an indirect means of diagnosis, because it relies on humoral immune reaction to the spirochete. Thus, it has limitations. There are several different serologic tests that are used. First, there are non-treponemal tests, such as RPR and VDRL. They are based upon the reaction of human serum from patients with syphilis to cardiolipin-cholesterol-lecithin antigen. A positive test is usually reported as an antibody titer, and it is confirmed with a treponemal test (discussed below). The titer is used to follow the disease and assure adequate treatment, because it usually decreases as the infection is successfully treated. Specifically, a four fold decrease in titer is expected in the 6 to 12 months following treatment (Hicks et al., 2006). Non-treponemal tests are inexpensive and widely used for screening.

Treponemal tests, e.g. FTA-ABS, TPPA, use *T. Pallidum* antigens and are based upon the detection of treponemal antibodies directed against the cellular components of the spirochete. In the majority of people, these tests remain positive for life, regardless of treatment. Although, 15-25% of those treated in the early stage will revert back to negative in 2-3 years (CDC, 2006). Treponemal tests are more complex, often more expensive, and usually are used only as confirmatory tests. However, recently been several rapid treponemal tests, such as the Abbott Determine

Rapid Syphilis TP assay, have been developed. They are quick, providing a result in approximately 8-20 minutes, and are highly sensitive and specific. They are simple and require little user training or skill. Thus, there has been a trend in using these rapid tests as screening tools in low resource areas or where follow-up is difficult. They are less helpful in areas of high prevalence of syphilis, since the test will remain positive regardless of treatment.

Treatment of syphilis varies depending on whether it is early or late. Early syphilis generally requires only one dose of IM Benzathine Penicillin. Late syphilis requires treatment with IM penicillin for three consecutive weeks. Neurosyphilis and congenital syphilis require special treatment. The following table provides details on treatment regimens.

<u>Treatment Options for Syphilis</u>
Early (primary, secondary, or latent less than one year)
Drugs of Choice: Penicillin G benzathine 2.4 million units IM once*
Alternatives: Doxycycline** 100mg orally BID or Tetracycline** 500mg QID for 14 days if primary or secondary or 4 weeks if latent
Late (more than one year's duration, cardiovascular, gumma, late-onset)
Drug of choice: Penicillin G Benzathine 2.4 million units IM weekly for 3 weeks
Alternatives: Doxycycline** 100mg BID or Tetracycline** 500mg orally twice daily for 4 weeks
Neurosyphilis
Drugs of choice: Aqueous crystalline penicillin G 18–24 million units per day, administered as 3–4 million units IV every 4 hours or continuous infusion, for 10–14 days
Alternatives: Penicillin G procaine 2.4 million units IM daily plus probenecid 500mg four times daily oral, both for 10 to 14 days or Ceftriaxone 2 g daily either IM or IV for 10–14 days

Table 1: Treatment Options for Syphilis (CDC, 2006)

* Some experts recommend a repeat dose after seven days, especially in patients with HIV infection or pregnant women

** Not recommended in pregnancy

In addition to the treatment regimens described in this table, a recent study published in the New England Journal of Medicine showed the efficacy of single dose Azithromycin for the treatment of primary syphilis and high-titer latent syphilis (Reidner et al., 2005).

Maternal and Congenital Syphilis

Syphilis during pregnancy is referred to as maternal syphilis. Syphilis is one of the TORCH infections that can cause fetal infection, and it can have devastating consequences for offspring. If maternal infection remains untreated, there is increased risk of adverse outcomes. Eighty percent of children born to infected, untreated mothers will be affected with such problems as intrauterine growth restriction, stillbirth, neonatal death, preterm birth, or congenital infection and anomalies (Norwitz, 2006). Intrauterine infection with syphilis is associated with a 25–50% rate of miscarriage or stillbirth, particularly if acquired early in pregnancy (Jenson, 2002). Estimates of the damage caused by maternal syphilis are extensive. One million pregnancies each year worldwide are adversely affected by syphilis due to maternal infection. About 270,000 babies are born with congenital syphilis, 460,000 pregnancies end in spontaneous abortion or perinatal death, and 270,000 are born prematurely or with low birth weight (Walker et al., 2003).

T. Pallidum readily crosses the placenta. Vertical transmission of syphilis may happen at any time during pregnancy, but usually no earlier than six weeks of gestation. It mostly occurs in the second half of pregnancy (Johnson, 2006). The highest rates of fetal mortality and morbidity occur with untreated first-trimester and second-trimester infection; a higher percentage of asymptomatic disease occurs in

third-trimester infection (Wicher et al., 2003). Transmission can occur at any stage of the disease. Fetal transmission rates were studied in the early 1950s. For women with primary and secondary syphilis during late pregnancy, there was a 90% rate of transmission of the spirochete to the fetus. For women with early latent syphilis there was a 40% transmission rate, and for women with late latent disease there was a 10% rate of transmission (Jenson, 2002). Transmission may also occur during the birthing process if the infant comes into contact with a contagious lesion, such as a chancre on the cervix or in the vaginal vault (Jenson, 2002).

The incidence of congenital disease usually corresponds to the incidence of disease in women of childbearing age as a result of the high rates of perinatal transmission (Johnson, 2006). Overt infection can manifest in the newborn period or later in childhood. Two-thirds of live-born neonates with congenital syphilis are asymptomatic at birth (Jenson, 2002). In early infancy, clues to congenital syphilis may be failure to thrive, persistent rhinitis known as snuffles (see Figure 5), unusual rashes (particularly in the diaper area) (see Figure 6), unexplained jaundice or hepatosplenomegaly, and anemia. Hepatosplenomegaly is present in most infants with congenital syphilis. Approximately one half of infected infants will have some degree of generalized neonatal lymphadenopathy. A variety of hematologic abnormalities are common in congenital syphilis, including anemia, leukopenia or leukocytosis, and thrombocytopenia. Many infants with symptomatic congenital syphilis will have skin manifestations. A maculopapular rash (See Figure 7) classically may appear at 2 weeks of age and last 1–3 months if untreated. The lesions are oval, pink, and red and may become a copper-brown color. The rash may occur on all body surfaces, but especially the buttocks, back, thighs and soles. Disseminated

vesicular bullae that typically involve the palms and soles are another common type of rash (see Figure 8). These bullous lesions may contain fluid with many spirochetes. When they rupture they release the organisms and leave a denuded area that may become macerated and crusted (See Figures 9 and 10). Condyloma lata may occur at 2-3 months of age in perioral area, around the nose and angles of the mouth, or in the perianal area (See Figure 11). Both the Bullous lesions and the Condyloma lata are extremely infectious. Characteristic bone lesions are the most frequently encountered abnormalities of early congenital syphilis and include periostitis and osteochondritis identifiable on x-ray. This may lead to a type of paralysis called Pseudoparalysis of Parrot. Nephrotic syndrome may develop at 2 to 3 months of age. The most devastating effects occur in the central nervous system, with >60% of infants having abnormal cerebrospinal fluid at birth. They may develop acute or subacute meningitis, and the infection may eventually lead to mental retardation. The eye is infrequently involved in early congenital syphilis and may include chancres of the eyelids, chorioretinitis, uveitis, and glaucoma secondary to uveitis (Jenson, 2002).

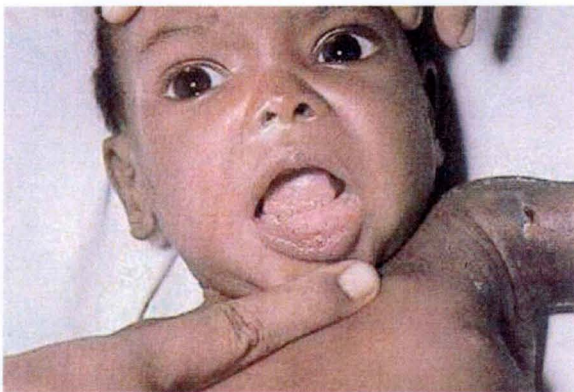


Figure 5: The snuffles



Figure 6: Rash in the diaper area from congenital syphilis

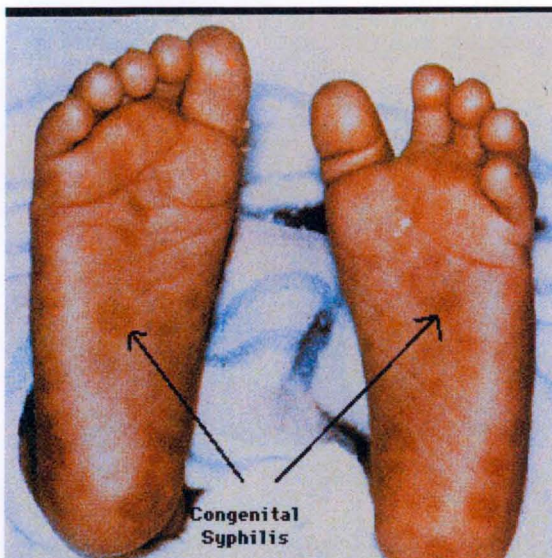


Figure 7: Maculopapular rash of congenital syphilis



Figure 8 Vesicular Bullae of Congenital Syphilis



Figure 9 Macerating and crusting from rash of congenital syphilis



Figure 10 Macerating and crusting from Congenital Syphilis



Figure 11 Condyloma lata on face from congenital syphilis

Late manifestations may develop if congenital syphilis is not promptly recognized and treated at birth. There may be prominent dental changes, including Hutchinson's Teeth (See Figure 12) or Mulberry Molars (see Figure 13). Ocular changes include interstitial keratitis, healed chorioretinitis, and secondary glaucoma with or without corneal scarring. Eighth nerve deafness occurs in about 3% of the patients. With time, as a result of scarring from infection, the child may develop characteristic facial deformities including frontal bossing, saddle nose deformity, high

arched palate, and protuberant mandible. There may be linear scars, or rhagades, that result from fissures and ulcerations around body orifices. Neurologic manifestations of late congenital syphilis include mental retardation, hydrocephalus, convulsive disorders, blindness, and deafness. Early treatment can prevent all of these late sequelae (Jenson, 2002). A summary of the manifestations of early and late congenital syphilis can be found in Table 2.



Figure 12 Hutchinson's Teeth

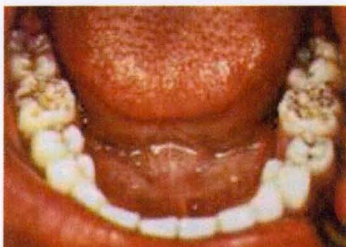


Figure 13 Mulberry Molars

<p><u>Early Congenital Syphilis</u> Occurring in the first few weeks and months of life.</p>	<p><u>Late Congenital Syphilis:</u> Represents scars induced by initial lesions of early congenital syphilis or reaction to persistent / ongoing inflammation. Occur months to years after birth.</p>
<p><u>Features</u></p> <ul style="list-style-type: none"> • Prematurity • IUGR • Failure to thrive • Persistent Rhinitis “snuffles” (15-60%) • Unexplained Jaundice (33%) • Hepatosplenomegaly (most) • Anemia • Thrombocytopenia • Generalized lymphadenopathy (50%) • Generalized maculopapular rash with superficial desquamation • Scaling of palms and soles • Palmar plantar rash • Bullous lesions • Intractable Diaper Rash • Condylomata lata • Osteochondritis, periostitis, osteomyelitis • Pseudoparalysis of Parrot • Pneumonia alba • Rare ocular involvement (uveitis, chorioretinitis, cataract, glaucoma, salt and pepper fundus) • Aseptic Meningitis • Nonimmune hydrops • Nephrotic Syndrome 	<p><u>Features:</u></p> <p>Dentition</p> <ul style="list-style-type: none"> • Hutchinson Teeth • Mulberry Molars <p>Eye</p> <ul style="list-style-type: none"> • Interstitial keratitis • Healed chorioretinitis • Uveitis • Glaucoma • Corneal Scarring <p>Ear</p> <ul style="list-style-type: none"> • Eighth nerve deafness <p>Nose and Face</p> <ul style="list-style-type: none"> • Frontal bossing • Saddle nose • Protuberant Mandible <p>Skin</p> <ul style="list-style-type: none"> • Rhadages <p>Central Nervous system</p> <ul style="list-style-type: none"> • Mental retardation • Arrested hydrocephalus • Seizures

Table 2: Manifestations of Congenital Syphilis. From (Jenson, 2002) and (Pediatric OnCall, 2006).

The diagnosis of congenital syphilis is confounded by the fact that maternal antibodies persist in the infant’s body after birth. This makes the interpretation of syphilis serology in newborns difficult. The CDC says that treatment decisions must often be made based upon 1) Identification of syphilis in the mother, 2) Adequacy of

maternal treatment, 3) Presence of clinical, laboratory, or radiographic evidence of syphilis in the infant, and 4) comparison of maternal (at delivery) and infant non-treponemal serologic titers (CDC, 2006). In keeping with these guidelines, the CDC recommends that all infants born to women with reactive tests at any point in pregnancy be tested with a non-treponemal test. Both the mother and baby should be tested on the same day at the same lab. If the baby's antibody titer is four-fold greater than the mother's, then this is suggestive of possible congenital syphilis. The infant should also be thoroughly examined for evidence of congenital syphilis and darkfield microscopy should be performed on specimens from any suspicious lesions (CDC, 2006). If the diagnosis of syphilis is likely based on the above examinations, further testing may be done and parenteral penicillin treatment will be given based upon these findings. The CDC detailed scheme of diagnosis and treatment of possible cases of congenital syphilis can be found in Appendix 1. Of note, the CDC recommends that even infants with no signs of congenital syphilis should still receive a single dose of Benzathine Penicillin G IM 50,000units/kg/dose even if their mothers were appropriately treated greater than 4 weeks prior to delivery, and their serology is not suggestive of syphilis (Appendix 1: Scenario 3) (CDC, 2006).

The problems associated with maternal and congenital syphilis can be almost completely eliminated by universal early antepartum screening and treatment with appropriate antibiotics (Norwitz, 2006). The WHO recommends that all pregnant women be screened for syphilis. Testing should be done for all women at the first prenatal visit, and ideally in the first trimester. Some have recommended that it then be repeated at 28 weeks and at delivery for high prevalence populations (WHO, 2004;

CDC, 2006). It is important to remember, however, that maternal syphilis treated less than 4 weeks before delivery, even with an appropriate penicillin regimen, is a significant risk factor for congenital syphilis. Thus, even if a mother is appropriately treated very late in pregnancy, a high index of suspicion of congenital syphilis in the child should remain (Jenson, 2002).

Penicillin remains the gold standard for treatment of pregnant women, and it is effective in treating maternal disease, preventing transmission to the fetus, and treating already existing fetal disease. According to the CDC, there is insufficient evidence at this time to determine a specific treatment regimen for pregnancy, so they recommend that the regimen be the same as in non-pregnant adults, and the details of dosing can be found in Table 1 (CDC, 2006). It is important to note that, as mentioned before, it is often difficult to tell the difference between early and late disease. Thus, unless there is clear evidence that maternal infection occurred within one year of diagnosis or that the mother has primary or secondary syphilis at the time of diagnosis, the disease should be considered latent syphilis of unknown duration, and it should be treated as late syphilis (i.e. 3 doses of PCN over 3 weeks) to ensure adequate therapy (CDC, 2006).

Since there is no firm evidence on how many doses of Penicillin are necessary for optimal treatment of pregnant women with syphilis, some have researched the efficacy of several different dosing regimens, such as treating all positive women with a single dose of PCN. This is important, since in low resource settings it can be very difficult to maintain follow-up for full treatment. For example, a study done in Tanzania looked at the efficacy of a single dose of 2.4million units of Benzathine

penicillin in treating 556 RPR-positive pregnant women. There were found to be no significant differences in birth outcomes between those treated for syphilis and sero-negative women of the same cohort (Watson-Jones et al, 2005). There have been no randomized controlled trials to support this study, however. Another study cited by the WHO Integrated Management of Pregnancy and Childbirth (IMPAC) showed a high rate (20%) of perinatal death in offspring of inadequately treated pregnant women. Inadequate treatment in this study was defined as less than 2 doses of 2.4 million units of Benzathine PCN (WHO, 2002). Thus, there remains controversy over the correct dosing for pregnant women with syphilis.

According to CDC guidelines, after initial treatment for syphilis, the mother must be followed with serial monthly non-treponemal serology to make sure that treatment was effective, with re-treatment if there is not sufficient decline in RPR/VDRL titers (CDC, 2006). Partners of affected women should be treated as well (WHO, 2004).

Endemic Treponematoses

Venereal syphilis has many similarities with a group of diseases called endemic treponematoses. Treponematoses traditionally refers to the group of non-venereal diseases that are caused by the *Treponema* species. The etiologic agents are morphologically and serologically identical to each other and to *Treponema Pallidum* subspecies *Pallidum* (the etiologic agent of venereal syphilis). Thus, a person with one of the endemic treponematoses will have the same serologic reaction that a person with venereal syphilis would have, and there are no readily available tests that can differentiate between the diseases. The only differences among them are

the clinical and epidemiologic pictures (Fine et al, 2006). The specific diseases are Yaws (*Treponema Pallidum Pertenuae*), bejel or endemic syphilis (*Treponema pallidum endemicum*) and Pinta (*Treponema Carateum*).

The endemic treponematoses predominantly affect children under 15 years of age in the most underprivileged remote rural communities in the tropical belt (Antal et al., 2002). Bejel may also be seen in arid areas and some temperate zones (Antal et al., 2002). All of the non-venereal treponematoses are transmitted mostly by direct contact, such as skin-to-skin/mucous membrane contact or perhaps by sharing of drinking vessels (predominantly in bejel). They are not sexually or vertically transmitted (Antal et al., 2002).

As with venereal syphilis, the diseases are divided into early and late stages. The early stage lasts up to five years from the time of infection (Antal et al., 2002). In the primary stage, a cutaneous/mucosal lesion may occur at the site of inoculation following an incubation period of a few weeks. The treponeme may then be spread throughout the rest of the body hematogenously or topically. The early lesions are highly infectious. Also similar to venereal syphilis, the disease may then become latent or the person may go on to develop late stages. All of the endemic treponematoses have a relapsing and remitting course and have prominent cutaneous manifestations, which in the case of Pinta are the only clinical expression (Antal et al., 2002). In Yaws and Endemic Syphilis, the disease process also involves the mucous membranes and bones. Cardiovascular and neurological complications are extremely rare, but they have been observed.

In the 1950's and 60's there was a worldwide campaign for eradication of the endemic treponematoses that involved mass penicillin administration. This served to

nearly eradicate them for a period. However, there has been resurgence in recent years in certain areas of the world, such as West and Central Africa and Southeast Asia.

Haiti

Land and People

Haiti is a country that occupies the western third of the island of Hispaniola, which is situated in the Caribbean between Cuba and Puerto Rico (See Figure 14). The Dominican Republic occupies the rest of the Island. Five mountain ranges dominate Haiti's territory and divide it into three regions—northern, central, and southern. It has a tropical climate with distinct dry and rainy seasons (dry—December to February; Rainy—April to November). There are several large rivers that often overflow in the rainy season and slow to a trickle in the dry season. Haiti has few natural resources, because of the small land area and environmental degradation, but wood and minerals are the most important of them. Because of the importance of wood to the economy, Haiti now faces a severe deforestation problem. At present, forest only covers 2% of the country. Deforestation has led to soil erosion, which has caused deadly landslides and decreased agricultural yields. Most of the land is too steep for agriculture, and this in combination with the soil erosion makes only 28% of the land arable (Federal Research Division, 2006).



Image courtesy of the CIA World Factbook

Figure 14. Map of Haiti

In 2006, the estimated population of Haiti was 8.3 million with an annual growth rate of 2.3%. It is the Western Hemisphere's second most densely populated country, following Barbados. Haiti has 248 persons per square kilometer. Most of the people live in small towns. Haiti has only 4 cities with a population greater than 100,000 and Port Au Prince, the capital, is the largest of them with 1.2 million people in 2006 (Federal Research Division, 2006).

Nearly all (95%) of Haiti's population is of African ancestry, the remaining 5% is mulatto, or white. French and Creole are the official languages of the country. Eighty percent of Haitians belong to the Roman Catholic faith. However, Catholicism is often combined with voodoo, an ancestor-based Theist-Animist religious tradition that derives from West Africa. Sixteen percent of the population is Protestant (Federal Research Division, 2006).

Educational attainment in Haiti is very low, and only 53% of the population is literate. Access to schools is difficult, especially for those in rural villages. There has been some reform by the government to increase funding for schools and provide better access to quality education. In spite of these efforts education is still a major problem for the country (Federal Research Division, 2006).

Political and Economic Situation

Natural disasters, poverty, economic stagnation, racial discord, and political instability have plagued Haiti since its establishment as an independent state in 1802, when it became free of French rule. In recent years the political situation has been particularly dire. The many recent conflicts have resulted in many deaths, destruction to infrastructure, increases in prices, prolonged interruption of public services, including water, trash collection, and electricity (PAHO, 2001).

The continuing political instability has led to a difficult economic situation in Haiti. Haiti is the poorest country in the Western hemisphere (WHO, 2004). The annual per capita income is about US\$450. Most of the population faces underemployment (60%). Only one in 50 Haitians has a steady paying job. Living and working conditions are so poor that one in eight Haitians lives outside Haiti's borders. As mentioned, the country's potential for economic growth is hindered by political instability, lack of infrastructure, and severe deforestation and soil erosion. The distribution of wealth is highly distorted, with 80% living below the poverty line. In response to the difficult economic situation, there have been many international organizations providing relief in Haiti. The US has been Haiti's largest donor since 1973 and contributed \$850 million to the country's development (Federal Research Division, 2006).

Health

The health situation in Haiti is also poor. This is also related to the political and economic instability of the country. Haiti has the worst health indicators of the Americas. The life expectancy at birth is 53 years for males and 56 for females (WHO, 2004). Both Haiti's death rate (12.2 per 1,000 in 2006) and infant mortality rate (72 per 1,000 in 2006) are the highest in the Western Hemisphere (Federal Research Division, 2006). Despite humanitarian aid efforts, food insecurity and malnutrition, poor drinking water supply, sanitation, and lack of access to healthcare remain major threats to Haitian health (WHO, 2004).

Although the infant mortality rate has been steadily declining since 1960, it remains high in contrast with that of more developed countries, such as the United States (approximately 6 per 1,000 in 2005) (UNICEF, 2007). It is also much higher in Haiti than in the surrounding countries. Cuba's infant mortality rate was 7.2 per 1,000 (PAHO Cuba, 2002) and the Dominican Republic's 40 per 1,000 (PAHO Dominican Republic, 2002). The high infant mortality rate has been associated with poverty, deficiencies in the health system, and the impact of the AIDS epidemic (WHO, 2004). In 1999, the leading causes of death for infants and children included acute diarrheal illnesses (12.1%), infections of the perinatal period (10.2%), malnutrition (9.1%), and acute respiratory illnesses (6.9%) (WHO, 2004). Nearly one-half of all deaths occur within the first 5 years of life (PAHO, 2001).

The maternal mortality rate in 2000 was 523 per 100,000 live births, which had increased by 15% since 1995 (WHO, 2004). Most maternal deaths are related to maternal hypertension, eclampsia, and labor complications. Most (76%) births occur without skilled attendants. Domestic violence and sexual abuse are very

prevalent, and 70% of women and adolescent girls report having experienced some kind of violence (WHO, 2004).

HIV/AIDS is a major problem in the country. Haiti has the second highest prevalence after sub-saharan Africa. It is estimated that 5.6% of the adult population is affected, and AIDS is the leading cause of death among adolescents (5.8%) and adults (21.6%). Tuberculosis is also a significant problem in the country, and the AIDS epidemic has aggravated the TB impact. In 1999 TB was the sixth most common cause of death, with a prevalence of 114 per 100,000 (WHO, 2004).

As mentioned, malnutrition is a significant problem, with 40% of Haitian homes being categorized as “food insecure” and 42% of Haitian children being underweight secondary to malnutrition (World Food Program, 2006). Less than half the population has access to clean water supply, a number that is low compared to other developing nations (Federal Research Division, 2006). No city has a public sewerage system, and there only are isolated wastewater treatment units throughout the country (PAHO, 2001). Solid waste management is another serious problem, and poor disposal practices are polluting almost all 18 water sources supplying Port-au-Prince (PAHO, 2001).

Health System

The Haitian Health System is a complex web of players. There is a public sector, a private for-profit sector, a mixed non-profit sector, a private non-profit sector, and the traditional health system (WHO, 2004). The public sector was seriously affected by the country’s political crisis, which led most foreign aid to be channeled through nongovernmental organizations (NGOs) (PAHO, 2001). Thus, the private not-for profit sector currently dominates the healthcare scene.

Between 40 and 60% of Haiti's population has access to western health services (WHO, 2004). Many use traditional medicine before going to the western health providers --more so in the rural areas (WHO, 2004). Public funds spent on healthcare equal only 0.8% to 1.0% of the national GDP (WHO, 2004). There are 49 hospitals, 271 health centers, and 317 health posts in Haiti. Human resources are inadequate, with only 2.4 physicians, 1 nurse and 3.1 auxiliaries per 10,000 people (WHO, 2004). Most of the personnel are found in the cities, resulting in even lower ratios and limited access in rural areas.

Maternal and Congenital Syphilis in Haiti

Haiti has played an interesting role in the long history of syphilis. Some medical historians have suggested that Columbus' crew contracted syphilis during their stay on the island of Hispaniola in 1492 and introduced the disease to Europe upon their return (Luger, 1993). Regardless of the veracity of this theory, Haiti has certainly had a long and difficult battle with syphilis.

The CDC, in collaboration with GHESKIO and the Haitian Ministry of Health has conducted periodic sero-prevalence studies of syphilis, HIV, and Hepatitis B and C in several different regions of Haiti. The studies first began in the early 1990's and the most recent took place in 2007 (results pending). In addition to looking at prevalence, they have also analyzed the relationships between these diseases and certain sociodemographic characteristics.

In the most recent study (2003/2004), 17 test sites were selected around Haiti. Women were systematically chosen for testing when they came for their first prenatal visit. A total sample of 6,779 pregnant women was obtained. These women were all

tested for syphilis, using RPR and confirmatory TPHA if the RPR was positive. The percent of positive syphilis tests for the entire country was 3.5%, with a range of 1.8% to 7.0%. The region with the highest prevalence was Jeremie, the location of this study. (See figure 15 for geographic distribution of syphilis) (Ministere De La Sante Publique, 2004).

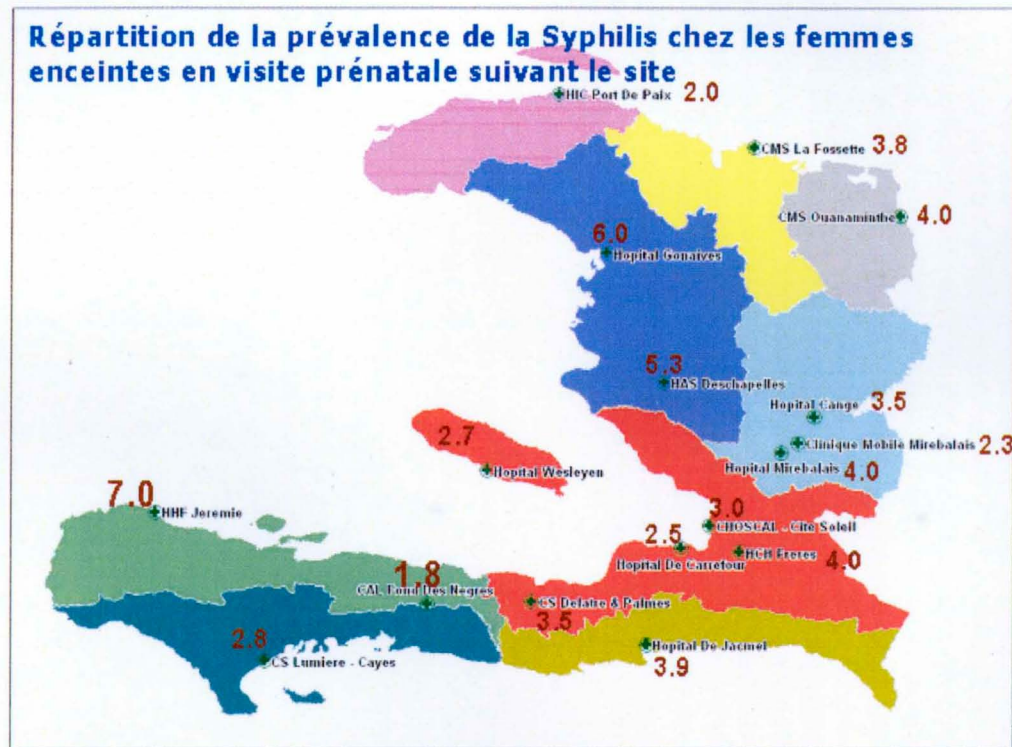


Figure 15. Prevalence of syphilis in pregnant woman at sites in Haiti (Ministere De La Sante Publique, 2004)

In the prior study (2000) there was an overall syphilis prevalence rate of 3.31% for the entire country, with a range of 2.25% to 9.75%. Again, Jeremie had the highest prevalence (9.75%) (Ministere De La Sante Publique, 2000).

The authors of the sero-prevalence study found that there is a relationship between age and syphilis sero-positivity. Women greater than 40 years old were

more likely to have syphilis than those younger than 40. The percent of women with syphilis differed by level of education; 5.5% of women without any education were positive, while only 2.4% of those with a secondary school education or higher were positive. Those women cohabitating with their partner had more syphilis (4%) than those who were not cohabitating (2.4%). 3.9% of the women from urban locations were positive compared to 3.5% of those from rural areas (Ministere De La Sante Publique, 2004).

Two studies on maternal and congenital syphilis were done in Haiti's Rural Artibonite valley in 1996. The purpose of the first was to assess the prevalence, burden, and control of syphilis in Haiti's rural Artibonite region. The authors assessed the seroprevalence of syphilis among 811 women receiving prenatal care at five Hospital Albert Schweitzer rural dispensaries using RPR and confirmatory FTA-ABS testing. They also reviewed hospital and dispensary records looking for cases of genital ulcer disease and syphilis (acquired and congenital) cases seen in the previous year (Fitzgerald et al., 1998).

The authors found that 5.7% of the women had reactive RPR's and 97.8% of these were confirmed by FTA-ABS. They found a variation in prevalence based on whether the dispensary was located in the valley or in the mountains--6.3% of valley women were positive while only 2.5% of mountain women had syphilis. Of the women who were positive, 38.2% received adequate treatment (defined as 3 doses of 2.4million units of Benzathine penicillin), 20.6% received inadequate treatment (less than 3 doses), and 41.2% received no treatment at all (Fitzgerald et al., 1998).

The review of hospital records identified 257 cases of syphilis. They were divided into categories as can be seen in Table 3.

Stage	Adult Men (n=102)	Adult Women (n=122)	Total (n=257)(%)
Primary	16	0	16 (6.2)
Secondary	10	4	14 (5.4)
Latent	63	105	168 (65.4)
Recurrent	5	12	17 (6.6)
Tertiary	8	1	9 (3.5)
Congenital	--	--	33 (12.8)

Table 3. Syphilis Cases Diagnosed at Hospital Albert Schweitzer. (Fitzgerald et al. 1998)

Of the 33 cases of congenital syphilis, 12 (36.4%) were stillbirths born to RPR positive women who had no treatment prior to delivery. Twenty-one (63.6%) were clinically symptomatic neonates brought to the hospital after home delivery. Five (23.8%) died during their hospitalization. There was a 51.5% total mortality rate (17 out of 33) for congenital syphilis (Fitzgerald et al., 1998).

The study concluded that the 33 cases of congenital syphilis, a rate of 550 for 100,000 live births, demonstrated a failure of local syphilis control measures. Furthermore, it determined that self-referral for symptomatic disease, centralized serologic screening, and partner notification were not sufficient to control the syphilis epidemic in the region. One of the major pitfalls was the lack of decentralized screening, demonstrated by the fact that only 41% of positive women were not treated, and many of those treated received inadequate care (Fitzgerald et al., 1998).

As a result of the above findings, the HAS instituted changes in the syphilis testing and treatment protocol. They started decentralized prenatal screening for syphilis, same-day treatment of sero-reactors, and strengthened partner treatment efforts. As a follow-up to the initial study, a study was done in 2003 looking at the effect of these changes on the number of women adequately treated for syphilis and

the number of cases of congenital syphilis. They found that though the rate of syphilis remained stable, 50 out of 50 women sampled (100%) were adequately treated and the rate of congenital syphilis had decreased to an average of 137 per 100,000 over 3 years (from 550 per 100,000 in 1995). This was a 75% decrease ($P<0.001$) in congenital syphilis since the change in screening and treatment. This study demonstrated the success of decentralized prenatal syphilis screening and treatment in rural Haiti (Desormeaux et al., 1996).

Haitian Guidelines for Syphilis Testing and Treatment During Pregnancy

The Manuel de Normes de Travail en Planification Familiale et en Soins Maternels: Akusage du Personnel de Sante (Manual of Norms for Family Planning and Maternal Care: Guidelines for Health Personnel, 1999) provides guidelines for syphilis testing, education, and treatment during pregnancy (Belotte et al., 1999). The Mott manual sets the norms for prenatal care in Haiti; it sets the standard of a minimum of 3 prenatal visits, the first of which should occur before the 4th month of gestation. At this first visit, a woman should be tested for syphilis using a VDRL. If the woman is positive, the manual gives guidelines for treatment. For primary syphilis, the woman and her partner are to both receive 2,400,000 units of Benzathine penicillin (1/2 dose in each buttock) one time. If the woman has secondary syphilis, she is to receive 2,400,000 units of Benzathine penicillin (1/2 dose each buttock) for three consecutive weeks. Her partner is to be treated with a one time dose as well. In the case of Penicillin allergy, a regimen of erythromycin may be substituted. There is no mention of the treatment of latent syphilis or syphilis of unknown duration. The

manual's section on prenatal education does not include any information about syphilis or other sexually transmitted diseases (Belotte et al., 1999).

Sexual Practices in Haiti

Important to understanding syphilis in Haiti is an overview of the sexual practices of Haitians. The 2003/2004 seroprevalence study cited above included a survey about the sexual practices of the women. They found that 34% of females 15-24 years old and 86% of females 25-49 years old were sexually active in the last 12 months. Of the women ages 15-24, 66% were not sexually active in the last 12 months, 33.4% had one partner, and 0.6% had 2 or more. For women 25-49, 13.3% were not sexually active in the last 12 months, 85% had 1 partner, and 1.7% had 2 or more partners. Regarding condom use, 23.3% of women age 15-24 used a condom during their last sexual encounter, and 10.1% of women 25-49 used a condom on their last encounter (Ministere De La Sante Publique, 2004). The 2004 UNAIDS Epidemiologic Fact Sheets on HIV/AIDS and Sexually Transmitted infections has further data on sexual relationships and condom use. In 2000, 30% of males and 19% of females age 15-24 reported condom use during sex with their last non-regular partner. Most (93%) males and 59% of females age 15-24 reported at least one sex partner other than a regular partner in the last 12 months (UNAIDS et al., 2004).

Endemic Treponematoses in Haiti

Haiti had a long struggle with Yaws until the 1950's-1960's when the worldwide campaign for eradication with massive penicillin administration occurred. Since that time there have only been scattered case reports.

Jeremie

The study locale was Jeremie, a small coastal town located in the Grand Anse in the southwestern part of Haiti. It is a mountainous and remote region. The area is lush and tropical, and has not been as affected by deforestation like the rest of the country, resulting in fewer landslides. Summers are hot, and there are frequent droughts. The rainy season and tropical storms make travel across rivers and valleys challenging (Haitian Health Foundation, 2007).

The main sources of work in Jeremie are subsistence farming, charcoal production, fishing and other rudimentary jobs. The average per capita earnings are \$90-300 per year. The area has inadequate access to transportation and communication, and many of the roads are in very poor condition (Haitian Health Foundation, 2007).

The majority of families in the greater Jeremie area live in one room mud huts with no electricity and no running water. Each house sleeps an average of 6 people. Clean water must be taken from distant uncapped springs and carried home several times a day. Nutrition and education are issues in the region. Only a few people go on to high school, college, or professional schools (Haitian Health Foundation, 2007).

The Haitian Health Foundation

The Haitian Health Foundation (HHF) is an NGO founded in the late 1980's. One of its missions is "Community-Based Primary Care" and it works to address health and development needs in the underserved communities of the Grand Anse. HHF is based in Jeremie town and has one urban and one rural clinic. It serves 104 villages with a total population of 200,000. The counties served by HHF are Jeremie,

Moron, Bonbon, and Roseaux. Within these counties, many of the villages are HHF registered villages. When a village is HHF registered, individuals are tracked by HHF in PHACT (described later), a family health tracking database.

Maternal and child health is a main focus of the organization. Many programs address maternal and child health as well as other areas of public health and development. A partial list of services and programs provided by HHF include the following (Uyungil, 2006):

1. A full-service, low cost, clinic in Jeremie
2. Prenatal care (Provided at the “Center of Hope” in Jeremie and at rural posts or dispensaries in the villages)
3. Birth Attendant Training and Birthing Kits
4. A maternal waiting home for high-risk pregnancies (COH)
5. Mothers’ and Fathers’ Clubs for health and community education
6. Birth and Death Registries
7. Immunizations and de-worming
8. Training in natural methods of child spacing including Lactation Amenorrhea Method (LAM), the Cervical Mucous Method (CMM), and Standard Day Method (SDM)
9. Dental Care
10. Nutritional Surveillance and nutritional recuperation for malnourished children with food support from Catholic Relief Services (CRS) and private donors
11. Exclusive breast-feeding program
12. Community Based Acute Respiratory Infection Treatment

13. Oral Rehydration Therapy
14. Integrated Management of Childhood Illness (IMCI) provided by nurses
15. Prevention of neonatal conjunctivitis
16. Participation in the national STD/AIDS surveillance program (1994)
17. Prenatal syphilis testing and treatment
18. Girls Responsible Sexuality Soccer Program
19. Home Repair and Construction with the Save-a-family Program where funds are allocated to building “Happy Homes” for families with the highest need
20. Latrine building
21. Pig, egg, and chicken distribution

One third of the funding for HHF programs comes from USAID, and two thirds from private sources. Major donors include the Conrad N. Hilton Fund for Sisters, Catholic Relief Services, AmeriCares, and CSS (Uyungil, 2006). Technical assistance comes from faculty and staff of the Institute for Reproductive Health at Georgetown University, University of Connecticut, University of Michigan, and others. The HHF Headquarters is located in Norwich, Connecticut, and its major functions are to provide administrative oversight, fundraising, and coordination of volunteer activities.

The Role of the Community Health Agent

Community participation is a key element of HHF. To this end, the Community Health Agents, or “Agents de Sante”, provide a link between the community and the medical providers/clinics. For each HHF zone, there is a health

agent who has been selected by the community and trained by HHF for one year. They are certified by the Ministry of Health and are paid staff members of HHF. Their role includes performing a periodic census, making home visits, preparing birth and death certificates, recognizing illness and making appropriate referrals or treatment, participation in the operation of monthly maternal and child health posts, leading mothers' and fathers' groups, and community education and development. Every month they travel to Jeremie for continuing education, monitoring and supervision, and discussion about current issues. They play a key role in HHF's mission of community oriented primary care.

PHACT

One of the unique aspects of HHF is its computerized database, PHACT. PHACT is a public health database created by Bette Gebrian PhD, public health director of HHF, with the support of long term rotary volunteer Robert Harris. PHACT stands for "Public Health Active Census Tracking." It is a custom designed family registration database in which each house in a censused community has a number, each family in a house has a number, and each individual within the family is represented by a digit of the number. The house number is displayed in the house and also on any documents associated with the individual. Information about each individual can be stored and retrieved using the unique number. Information kept in the database includes such things as demographics, economic indicators, births and deaths, prenatal visits, laboratory work, child weights, and immunizations. Each HHF village is re-censused periodically. The last census was in 2001 and the next is to take place in 2007. During the census verification year, each individual home is

visited by the health agent, health services are provided, referrals made, vital statistics verified, and out-migration noted. Material lifestyle indicators, including floor and roof type, latrine, water source and other key features, are updated in each census.

KOMBIT

KOMBIT is a USAID Child Survival Health Grant Program (CSHGP) project. It is a Haitian Creole acronym for 6 Creole words which mean “Community Organized for Mothers and Babies with Innovation and Technology.” KOMBIT is also a creole word for a community work group. It is a five year grant that focuses on maternal and newborn care, breastfeeding, and child spacing. KOMBIT is a partnership between HHF, the Ministry of Health (MOH) and Sisters of the Good Shepherd (SGS). It was created to address maternal and newborn mortality in HHF registered villages and to expand services to non-HHF villages. Some of the main activities of KOMBIT have been the following: a) Conducting a baseline assessment of 247 villages; b) Forming mothers groups in non-HHF registered villages to enhance community participation and education; c) Promoting mother-to-mother education; d) Tracking maternal deaths; e) Creating workshops and radio programs to promote health messages such as danger signs of pregnancy, obstetrical evacuation plans, and pre/postnatal consultations; f) Encouraging villages to learn about and practice natural family planning; g) Human reproductive rights training; h) Promoting exclusive breastfeeding; i) Promoting post-partum care; j) Teaching child-spacing by LAM (exclusive breastfeeding to prevent ovulation); and k) Teaching health agents, traditional birth attendants, and communities about Home Based Life-Saving Skills (HBLSS) (Uyungil, 2006).

The HHF Syphilis Program

There are two branches of the HHF syphilis program, rural and urban. The urban program began in the mid 1990's and provides syphilis testing using RPR and VDRL, education, and treatment of pregnant women at the urban HHF prenatal clinic. At present, the syphilis testing done in the clinics is subsidized by HHF. HHF has a free-standing lab where all of the RPR and VDRL testing is performed on site. Testing is done for all pregnant women, HIV patients, and those who are symptomatic. The testing and treatment protocol includes an RPR on the first prenatal visit (ideally in the first trimester) and treatment for those who are positive with IM Benzathine Penicillin 2.4 million units for two doses spaced 8 days apart. Women are encouraged to bring their sexual partner when they come for the second injection so that he can receive treatment and education as well.

The rural HHF syphilis project began in October of 2001. It provides syphilis testing using the Determine—TP Rapid Syphilis assay as well as treatment and education for all pregnant women and symptomatic individuals in the HHF service area. The major funding source for the project is the Hilton Foundation. The testing and treatment protocol is the same as in the urban program. A new component was added to the program in late 2006. Now, any woman who is found to have a positive rapid syphilis assay is referred to the urban clinic for an RPR and HIV test.

Research Goal:

This was an exploratory study of maternal syphilis in the areas served by HHF. There have been no syphilis studies in this region of the country. The overall

purpose was to provide baseline information about maternal syphilis in the region, both qualitative and quantitative, as preparation for future research and interventions.

Specific Aims:

- 1) Document data sources and identify data collection and entry issues related to syphilis data
- 2) Document the current epidemiology of maternal syphilis in five representative rural Haitian villages served by HHF
 - a) Define the prevalence
 - b) Describe the characteristics of syphilis positive women
 - c) Make comparisons between syphilis positive and negative women with regard to age, socioeconomic status, number of children and pregnancies
- 3) Examine the relationships between maternal syphilis and miscarriages, stillbirths, and early neonatal death in these villages
- 4) Begin to document and describe syphilis knowledge and attitudes of Haitian women and men
- 5) Evaluate the rural HHF maternal syphilis testing and treatment program and provide recommendations for change

Methodology:

The methods used to study maternal syphilis in this rural Haitian population involved assembling existing HHF quantitative data and gathering new qualitative data. This process is described in the following sections.

Qualitative Data:

General Observation

The author made three trips with rural maternity outreach clinics to observe the operation of the rural syphilis testing and treatment program. Three days were also spent observing the urban prenatal and postnatal clinics.

Key Informant Interviews

A variety of community and HHF leaders were selected for interview. These included the HHF medical director, HHF public health director, a physician from the Center of Hope, several KOMBIT and HHF nurses, three community health agents, and a local herbalist. All were experienced in their particular field and provided detailed information about the local culture and/or about the HHF syphilis program. For those who did not speak English, a Creole translator was provided for the interview. The interview purpose and process were explained to each participant and verbal consent was obtained. Each interview lasted from 10 to 20 minutes and was conducted in an open-ended conversational style. The topics were wide-ranging and covered such issues as details on the HHF syphilis program, community knowledge and attitudes about syphilis, local customs regarding syphilis, syphilis in Haiti, and HHF staff knowledge about syphilis.

In order to assess staff ability to identify congenital syphilis, all HHF nurses were identified. Ten percent (4 nurses) were randomly chosen to participate in an activity involving picture identification. A collection of pictures was compiled, six of which were pictures of congenital syphilis, and six of which were other conditions (gonorrhea, clubfoot, polydactyly, lanugo, milia, and stork bite). The pictures were reviewed for appropriateness and clarity with the medical director of HHF. The

pictures are included in Appendix 2. Each nurse was then asked to participate for a 10 minute interview, and verbal consent was obtained. Each person was asked to identify the condition represented by each picture.

Individual Interviews

The author had the opportunity to sit in on several interviews being conducted by the HHF program for other purposes. Relevant information was recorded and will be presented in the results section of this paper.

Group Interviews

A total of five group interviews were conducted, two with groups of pregnant women waiting for a prenatal consultation, one with non-pregnant women of varying ages, one with men who were local masons and laborers, and one with HHF nursing staff at the monthly staff meeting. These groups were selected to provide an understanding of the variety of ideas and knowledge levels about syphilis. The purpose of the first four group interviews was to gauge local knowledge and customs regarding syphilis. The last interview was to determine the barriers to syphilis testing and treatment in HHF. For each group, the process was explained and verbal consent was obtained prior to starting the discussion.

Group 1	Pregnant Women at Rural Prenatal Post	This group was composed of three pregnant women present for care at a rural prenatal post. They were approached while waiting in line for their consultation and asked to participate.
Group 2	General Women	This group was composed of five women ranging from 26 to 52 years of age. They were approached while cooking a meal and asked to participate.
Group 3	Pregnant Women at the Urban Prenatal Clinic	This group was composed of six pregnant women of a range of ages and duration of gestation. They were approached and asked to participate while waiting on the porch of the clinic for prenatal care at the Center of Hope.
Group 4	Masons	This group was composed of 5 men. They were approached while working on a building and asked to participate.
Group 5	HHF Nursing Staff	This group was composed of approximately 20 nurses. They were asked to participate while at the routine monthly staff meeting.

Table 4. Composition of group interviews.

The group interviews were conducted in a free-flowing conversational style. Thus, not all questions were the same for each group and further questions were asked in response to answers given. For the Groups 1 through 4, the first question was “What sexually transmitted diseases have you heard of?” If the group mentioned syphilis as an STD, then the next question was “What is syphilis?” If they did not mention it as an STD, the question “Have you ever heard of syphilis?” was asked. Each interview took a different path after that point. Questions were very general and open ended, thus allowing for freedom and variety in the type of responses given.

Quantitative Data

Data Collection

Five villages were chosen for the quantitative data analysis portion of the research. The villages were chosen based on the length of time in the HHF system,

the number of people served in the area, and the knowledge and experience of the health agents. Village 1 has been an HHF village since 2003, it is approximately a 1.5 hour drive or 4 hour walk from Jeremie. Villages 2 and 3 are next to one another and are both an 8 hour walk or 2.5 hour drive from Jeremie. They have been part of HHF since 1988. Villages 4 and 5 are the most distant in the service area of HHF, a 14 and 15 hour walk, and are currently inaccessible by motor vehicles. They have been part of HHF since 1988 (Gebrian, 1993).

The majority of the quantitative data was taken from PHACT. Syphilis tests and prenatal visits only began to be consistently entered into PHACT at the end of 2006. Thus, the data from 2004 up to the end of 2006 was entered by the author and several HHF staff members for the study. To do this, all existing paper records that could be located were sorted and the data was abstracted. Information taken from the prenatal visit records and entered into PHACT included the number of prenatal visits, syphilis status, and prenatal visit when the syphilis test was done.

In addition to the PHACT dataset, a separate dataset was created in order to look at the relationships between past birth outcomes and syphilis status. This was done because data on previous births was for the most part inaccurate in PHACT. Only pregnancies that occurred since a woman joined HHF were listed, and oftentimes pregnancy outcomes were not properly entered. Therefore, information from the pregnancy history on the prenatal form was entered into a separate excel file entitled “Past Birth Outcomes” in order to obtain a more accurate view of the relationship between syphilis status and pregnancy history. All of the 29 syphilis positive individuals were entered along with a random sample of 52 syphilis negative individuals. This data was entered into Excel.

Other data sources included reports from other database units, such as a summary by year of percent positive syphilis tests for rural and urban populations as well as data on the number of women and partners treated for syphilis by village. Birth-weights were taken from a Birth Registry file maintained by KOMBIT. Variables used in analysis and their sources can be found in Table 5.

<u>Variable</u>	<u>Data Source</u>	<u>Comments</u>
Village	PHACT	
Woman's Age at pregnancy	PHACT	Calculated by date of delivery minus birth date
Syphilis test	Clinic record entered into PHACT	Listed as positive, negative, or test not done
Age at first pregnancy	PHACT	First recorded delivery date minus birth date. May be inaccurate if woman joined HHF after first pregnancy
Birth Spacing	PHACT	Time in months between pregnancies
SES indicators	PHACT	Data not available for everyone; last census was in 2001
Male partner in household	PHACT	
Total prenatal visits	Clinic record entered into PHACT	
At which visit tested	Clinic record entered into PHACT	
Received first PCN dose	Clinic record entered into PHACT. Also aggregate total for zone from staff report	
Received 2 nd PCN dose	Data not available	
Partner treated	Individual data not available. Aggregate total for zone from staff report.	
Premature Births	Data not available	

Miscarriage or stillbirth	PHACT	Verified by health agent interview, death certificates, and midwife reports
Neonatal death	PHACT	Verified by health agent interview and death certificates
Weight of child at first visit (proxy for birth weight)	Birth Registry file maintained by KOMBIT	Information is available in PHACT, but is difficult to link mother to child in PHACT, so KOMBIT birthweight file was used
Age of the child at first weight	Birth Registry file maintained by KOMBIT	Used to determine how good a proxy the weight is for birthweight
Signs of congenital syphilis at birth	Interview of health agents about each individual syphilis positive patient	
Number of pregnancies	Clinic record entered into separate excel file	PHACT data unreliable.
Number of live children	Clinic record entered into separate excel file	PHACT data unreliable.
Number of previous stillbirths, miscarriages, or neonatal deaths	Clinic record entered into separate excel file.	PHACT data unreliable.

Table 5. This table shows the variables used in analysis, their source, and comments.

Data Verification

The PHACT reports of stillbirths and neonatal deaths were initially found to be inaccurate. Therefore, each stillbirth and neonatal death was verified by several means. First, all death certificates for 2004 through 2006 were sorted and collected. All identified stillbirths or neonatal deaths were checked against PHACT and entered if not already present. Second, the health agents for each community were given the PHACT “child dead at birth” report for their village and asked to identify which deaths actually occurred and whether there were any additional deaths that were not on the list. These deaths were then matched with death certificates and entered into

PHACT if not already present. A list of stillbirths maintained by rural midwives was also used in the verification process. Each stillbirth reported was listed and given to the appropriate health agent for confirmation. To ensure the accuracy of the deaths in the group of syphilis positive individuals, each individual pregnancy outcome was discussed with the health agent and then matched with the death certificate and entered into PHACT.

The rural, clinic, and combined statistics for syphilis positivity for the years 2003-2006 were verified by re-checking them with the original paper documents and correcting any mistakes.

Data Analysis

All data files were exported to version 12.0 of SPSS for analysis. Frequencies and distributions were examined. Chi square contingency tables, Independent T-test, and bivariate analysis were used. A P value of ≤ 0.05 was used to determine statistical significance.

Results

Qualitative

General Observations

The following information was gleaned from the 3 visits that the author made to rural prenatal posts.

The procedure for syphilis testing and treatment in the rural area includes monthly prenatal and postnatal posts held by HHF or KOMBIT nurses and staff in HHF registered villages. At the beginning of each post, a group education session is conducted one of the nurses. Topics discussed include breast feeding, danger signs of pregnancy, healthy eating, and infections in pregnancy, such as syphilis or HIV.

After this, each individual woman is registered and asked for a payment of 25 Gourdes (approximately 65 cents) prior to her exam. In the past women had to pay 25 Gourdes separately for the bloodwork just prior to receiving the test. This was changed in July, 2006, and now the entire visit, including the consultation, bloodwork, and any medicines costs 25 Gourdes, which is taken at the time of registration. A prenatal consultation is then done by the nurses. Syphilis testing may occur either during the nursing consultation or while the women are waiting to be seen. One of the staff, such as the nurse or health agent, looks through all of the prenatal records of the women present to determine who needs blood work. A fingerstick is done and a small amount of blood is drawn off into a thin capillary tube and then placed on the test strip. No pre-test education was done at this time. The test takes from 15 to 20 minutes to develop.

If the woman's test is negative, she continues with her prenatal visit. No post-test education was observed by the author. If the test is positive, then the health agent or nurse will educate the woman about syphilis, give her an injection of IM Benzathine Penicillin 2.4 million units, and instruct her to bring her partner back for education and treatment after 8 days.

If the woman was positive, when she comes back with her partner, either an HHF nurse, community health agent, or local dispensary staff would give the second injection to the woman and then take the partner aside and give education and treatment as well. The author did not get to directly observe partner treatment or administration of the second dose of PCN to the woman.

Key Informant Interviews

The first Key Informant interview done was with the Public Health Director. She is an American anthropologist and nurse who has lived in Haiti for 20 years. She has her BSN, MPH, and PHD. The interview was a conversation throughout the entire length of the author's stay in Haiti, and provided the context and background for the study.

The Public Health Director (PHD) had been involved with HHF since it began. She reviewed HHF's history, objectives and goals, past and ongoing public health projects, grants and donations, and local resources in Haiti. She reviewed the history of syphilis interventions globally and locally, including the implementation of the HHF urban and rural syphilis programs. She also reviewed pertinent aspects of local culture and sexual practices.

The background information allowed the author to understand the historical context and current understandings about syphilis in the area. The PHD felt that a baseline study of syphilis in the area, looking at what is really going on and how people understand it, would be valuable for HHF and that the information would help direct further research and interventions.

The second set of key informant interviews was done with two Haitian physicians. Each physician was interviewed separately. The first was very experienced and had been the medical director of HHF in Jeremie for 20 years. The second was a recent graduate of medical school. He had been in Jeremie working at the urban HHF prenatal clinic for one month at the time of the interview.

The medical director began by detailing the beginnings of the HHF syphilis testing and treatment program.

In the urban clinic we've been testing for syphilis for 10 years. Actually, we have always made the tests available, but most people couldn't afford them. Now the ministry of health has changed it so that we receive money for doing syphilis tests. They are now free at the urban clinics. We started testing for syphilis using a rapid test in the rural areas 5 years ago. We have to pay for these tests, and they are expensive—about \$1.50 a test.

He said that at the beginning of the program, the nurses were educated about syphilis testing and treatment. They were told that women were to be tested for syphilis on their first prenatal visit. "Really, it should be the first trimester, but women don't usually come until later in pregnancy, so we just say the first visit."

When asked about the syphilis treatment protocol and why two doses of PCN are given, the medical director said, "This is the international standard." He continued, "There are two categories of syphilis, symptomatic, and asymptomatic. We treat mostly asymptomatic disease, and two doses is more than enough. Really, one would be adequate." The younger doctor said that he had learned in school to give a one time dose of benzathine PCN 2.4 million units, 1.2million units in each buttock on the same day. He said this was adequate to treat syphilis in pregnancy. He said that sometimes penicillin allergy can be a problem, and in that case he was taught to use Azithromycin or Doxycycline.

The medical director talked about the use of the rapid syphilis test. "The problem with these tests is that they take a long time to lose their reactivity. So, if you retest them after treatment, they may still be positive. Even if you retest them in a second pregnancy, they may still be positive. We see a lot of false positives, I think."

The medical director discussed congenital syphilis saying that they do see occasional cases at HHF, but not a lot. They see more stillbirths in women with

syphilis than anything else. The younger doctor said that in his last month at HHF he has seen two cases of congenital syphilis. Most recently he had seen a baby born to a mom with syphilis, and the baby had a generalized rash that was also on its palms and soles. “She stayed in the hospital for 7 days after she was born and got 50,000uPCN/kg every day. After this she was supposed to get one shot of PCN once a week for three weeks, but the mom has only come back with her once so far.” He learned in his training that babies born to moms who have untreated syphilis are to be treated for congenital syphilis, regardless of whether they have symptoms or not. “The problem is that most of the time the baby is born at home, or if the baby is born in the hospital, the mom will not want to stay for the course of treatment, so she will just leave.” He further discussed what he learned in medical school about congenital syphilis saying,

Often babies with congenital syphilis are asymptomatic, or they don’t show any signs until later in life. However, the most common thing that you will see is a rash. It is a maculo-papular hyperpigmented erythematous rash that is classically on the hands and the feet, but also on the rest of the body. You can sometimes see neurologic symptoms, like the baby will be flaccid or floppy, but not all of them. Also, on x-ray their shins will be curved. These are manifestations of early syphilis in a baby. The later manifestations include malformations of the teeth, the palate, facial bones, and the shins. I have seen these cases in my medical school years, but not here in Jeremie yet.

The next group of key informant interviews were done with HHF and KOMBIT nursing staff. Four nurses were interviewed individually. The nurses had varying levels of experience in HHF and each offered a different perspective on the issues discussed.

The first topic discussed was the treatment of syphilis. All nurses asked agreed that the treatment protocol is 2.4million units of IM Benzathine PCN immediately after a woman is found to be positive and then again 8 days later. At

that time she also is to bring her partner for treatment. They also agreed saying that almost all women bring their partners for treatment. One nurse estimated 90% partner treatment. Usually the only time a partner will not come is if he is working in Port Au Prince. It is extremely rare for a man to refuse treatment. Although the men are instructed to bring any other partners that they may have to be treated as well, this occurs very infrequently.

The second topic discussed was education about syphilis. “We do pre and post test counseling” said one of the nurses. “Even if it is not positive, we tell them how they should live and what to do so they don’t get it.” Another said, “If a woman is found to be positive, she is educated about syphilis at that time.” Components of the education for the women were reported as follows: She is told that it is an infection that can cause damage, she could lose the baby—she could have a miscarriage or a stillbirth, the baby could have skin problems, the baby may have pus in its eyes or its bottom may be red. One nurse said that when a partner is brought for treatment, he is taken aside and educated as well. He is told that he may get a chancre, he could get secondary syphilis, it may affect his heart or hurt him in other ways. One nurse mentioned that the partner education can be a problem at some dispensaries. Often it is the staff of the dispensary, not KOMBIT or HHF staff, who will give the woman the second dose of PCN and treat the partner. She says that the dispensary staff are told what to say and encouraged to educate, “But I don’t stand with them, so I don’t really know if they do it or not.”

There was some disagreement among nurses about whether a woman with a positive rapid test should be re-tested with another rapid test after being treated. One nurse said that if a woman is positive, she will treat her and then test her again at the

next visit. If she is positive a second time, she will re-treat her. “Usually we just treat them once a year, though.” She said that she rarely sees a second positive test after the woman is treated. Another nurse said that she does not retest a woman after she is treated; rather the woman is referred to the urban HHF prenatal clinic for a true RPR and an HIV test.

One nurse discussed the regional variation of syphilis. “Here, in Roseaux, only 1 in 20 tests are positive. In other villages there is a lot more syphilis.” When asked why she thought this was the case, she said “Because here people live closer to the clinic, so they are more educated about it and have better care than if they are far away. They come to the clinic and hear a lot of things. They know they can get it from sex and what they need to do to keep from getting it. In other places they don’t.”

When asked if she’d seen any congenital syphilis, one nurse responded, “No, we don’t really keep track of the babies, just the moms. But we don’t see any congenital malformations like you would see with syphilis. We just see a lot of clubbed feet.”

The next group of interviews was with the community health agents in the villages selected for quantitative analysis. The health agent in village 1 had been working since 2003. The health agent for villages 2 and 3 had worked for 9 years and the health agent for villages 4 and 5 had worked for 9 years. The interviews were done individually.

The health agent for village 1 said the people in his village don’t know a lot about syphilis. They know that they are tested for it, and they know the signs, but

that is all. The health agent for villages 2 and 3 said that most of the people knew that syphilis is a serious illness that needs to be treated and that it is sexually transmitted.

All three health agents discussed what happens when a woman tells her partner that she has syphilis. They had differing opinions. The health agent from village 1 said that he has never known of any problems that have occurred in a couple because the woman has syphilis. “She tells him to come to the clinic and get treated. The men don’t feel like it is a terrible thing, like it is some grave disease. The men are happy to get treated once we educate them about it.” He says that he has never heard of any disagreements or fighting about the issue. The other two health agents indicated that there are often arguments. “If a man knows that he’s been faithful, he will get angry at his wife or vice versa.” They have never heard of a couple splitting up or getting violent because of it, however. One health agent recounted an incident: “There’s only one case that I can think of where it was really bad. The husband came to the clinic and was really angry. But after I explained things to him, and told him that they could both take the treatment and be healthy, he was not so angry anymore.”

All three health agents said that they have seen congenital syphilis in their villages, but not recently. All said that the baby could be recognized by a rash, but they reported different additional manifestations. Health agent 1 mentioned only the rash. Health agent 2 said the babies will have “swollen and pussy eyes, their bottoms will be red, the skin will peel on their bodies, and they will have a rash all over their bodies.” Health agent 3 said “The child will be handicapped and will not develop well. He will be small and not grow well. He will have impetigo on his skin everywhere.” When a case of congenital syphilis is suspected, the health agents refer the mother and baby to Jeremie or to a local dispensary for treatment.

One health agent discussed the relationship between magic and syphilis. “If a man thinks his wife is sleeping around, then he will go to a magician and put a ‘trap’ on the woman so that she has syphilis and gives it to her other lovers as well. These men can then also give it to their other lovers.” It’s harder for a woman to put a ‘trap’ on a man, men just do it better. So if a woman comes to the clinic and finds out she has syphilis, she may think that she’s had a ‘trap’ put on her. But she will usually only think this if something else is going on, like problems in her relationship. Women often think of it in a more biomedical way too.

The final key informant interview was with a local herbalist. He is 82 years old and has been treating with herbal remedies for many years. He has not seen a case of syphilis in years. “This is because of Penicillin. When they came with Penicillin, it got wiped out.” Years ago, there was a lot of syphilis, and people came to him to be treated.

“Syphilis is an infection of the blood.” He made a sharp distinction between infections of the blood and local infections. Gonorrhea, for example, is a local infection of “the canal.” Blood infections and local infections require different treatments. He believes that syphilis is a sexually transmitted infection. “When a man and a woman have intercourse, there is sometimes a little bit of blood present. If the blood mixes with the semen, it can go back into the body and into the blood. It goes throughout the blood and distributes everywhere.” He disagreed that a person can get syphilis from “sitting on a hot rock,” exclaiming, “this is just a man’s excuse!”

When asked about the treatment of syphilis, he says that nowadays he would just refer people to the doctor for a shot of penicillin. Prior to penicillin, he used

certain leaves and barks to treat it. These herbal treatments would take 2 to 3 months to cure a person, so penicillin is like a “miracle cure” because it clears it up in 2 to 3 days instead. He named 3 herbs/barks that he would use for the treatment of syphilis. This first, Chi frisse is like a “natural penicillin” that goes into the blood. The second two, boudon (Figure 16) and TPC (Figure 17) clean the urinary tract.



Figure 16 Boudon



Figure 17 TPC

He has never seen a case of maternal or congenital syphilis. “This would be very dangerous.” He said that he would immediately refer such a woman to the doctor for penicillin, or the baby might die inside of her. He believes that syphilis can be passed from mother to child through the blood. “Her blood circulates all around and goes into the baby. The baby can get whatever sicknesses the mom has. Sometimes it can also happen in labor, because there is exchange of blood.”

He said that voodoo cannot cause syphilis. He said that voodoo in general cannot make people sick, it can only kill a person suddenly, but this is more of a “mystical death.” He does not believe that one person can curse another with syphilis. Voodoo can help cure an illness, such as syphilis, however.

Nursing Staff picture identification:

Exact responses for the pictures can be found in Appendix 3.

Nurse #1 The first nurse correctly identified one of the six pictures of congenital

syphilis--the skin in the diaper area. For a second she thought about the possibility of syphilis as a cause of a generalized rash in a newborn. She has the perception that syphilis can be a cause of neonatal conjunctivitis.

Nurse #2 The second nurse correctly identified four out of the six pictures of congenital syphilis. He also had the perception that syphilis is a possible cause of neonatal conjunctivitis and that syphilis can cause congenital malformations. He misidentified a stork bite as a possible case of congenital syphilis.

Nurse #3 The third nurse suggested syphilis as a possibility for one of the pictures of congenital syphilis. Otherwise, syphilis was not considered for any of the other pictures.

Nurse #4 This nurse correctly identified one of the congenital syphilis pictures. She had the perception that syphilis can cause congenital malformations.

Individual Interviews

The author had the opportunity to sit in on several interviews being conducted at HHF for clinical and program operations purposes. The interviews covered a broad array of topics, and only information relevant to syphilis will be presented.

The author sat in on a total of seven interviews with pregnant women present at various clinics for prenatal care.

The interviewee's were as follows:

- 1) A 24 year old woman 8 weeks pregnant with her first baby attending at a rural clinic for her first prenatal visit
- 2) A 20 year old woman 8 months pregnant with her first baby presenting at a rural clinic for her 5th prenatal visit

- 3) A woman who was 5 months pregnant with 5 previous pregnancies. She was at a rural prenatal clinic for her first prenatal visit. She had been followed at the rural clinic for all of her past pregnancies.
- 4) A woman who was 7 months pregnant with her second pregnancy and was present at a rural prenatal clinic.
- 5) A 22 year old woman 8 months pregnant with her first baby who started coming for prenatal care at the urban prenatal clinic in her 4th month
- 6) A 30 year old woman 3 months pregnant present at the urban prenatal clinic for her first prenatal visit. She had 3 other children at home.
- 7) A 21 year old woman 6 months pregnant at her 5th prenatal visit at the urban prenatal clinic. She had one previous baby who died as an infant.

Themes:

What is syphilis and how does a person get it?

Three women said that syphilis is a disease that can be contracted during sexual relations. One woman said, “There are a bunch of diseases that a person can ‘catch during pregnancy’ and syphilis is one of them.” Two of the women felt that syphilis is just another name for AIDS or that syphilis and AIDS are very similar. Two women said they didn’t know anything about syphilis at all.

Where do women hear about syphilis?

Two women mentioned that they had heard about syphilis at a CARE (a local AIDS organization) youth group. One woman heard about it on the radio and at the clinic. Another woman heard about it at the marketplace from other women who were selling goods.

What are the symptoms of syphilis?

Rash, “pimples all over the body”, and diarrhea were the most common symptoms recounted by the women. Two of the four women who discussed the symptoms of syphilis mentioned these. One woman, who felt that AIDS and syphilis are very similar, mentioned rash, pimples, diarrhea, and weakness as symptoms of AIDS. One woman said that vaginal itching and discharge are symptoms of syphilis, and another mentioned hemorrhage. One woman said that someone with syphilis will also lose weight.

Partner Treatment

Partner treatment was a theme discussed with only one of the women. She had been diagnosed with syphilis and treated at the beginning of her pregnancy. She also brought in her partner to be treated when she came in for her second injection. She said that she told him about her diagnosis simply by asking him to come to the clinic. She did not explain to him very much what he was coming for. At the clinic they educated him about syphilis and treated him. “He was happy to get the treatment, though it did hurt a little.”

Group Interviews

Five group interviews were performed, the first four with general community members and the fifth with HHF nursing staff. The one with the HHF nursing staff will be discussed separately from the others.

Group Composition for Groups 1 through 4

Group 1: Pregnant Women at Rural Prenatal Post

This group interview was composed to three women present for care at a rural prenatal post. The first woman was 7 months pregnant, the second 5 months

pregnant, and the third was 4 months pregnant. They all had had previous pregnancies for which

they were followed by the prenatal post. All women participated actively in the discussion.

Group 2: General Women's Group

This group interview was composed of 5 women. They ranged in ages from 26 to 52 years old. One of the women has never had children. They were all eager and willing to participate. However, the younger women were quieter and had to be drawn out to participate, while the older women expressed strong opinions about the matters discussed.

Group 3: Urban Prenatal Group

This group involved six pregnant women who were waiting for prenatal care outside of the urban prenatal clinic. The group was composed of women of varying ages, number of previous pregnancies and current time in gestation. They were all pregnant at the time of the interview and had received care from the urban prenatal clinic. Some came from HHF villages and others did not. Thirty year old E was from a village called Jebo and was 7 months pregnant. She had 3 other children at home. Y was 16 years old and also came from Jebo. This was her first child. Thirty-two year old D was 9 months pregnant. She had 3 other children at home and came from a village called Latiboliere. M was 9 months pregnant and 32 years old. She came from Boyer and had two other children. P was 33 years old and came from Boyer. She was 6 months pregnant and had two other children at home. V was 4 months pregnant. She came from Carrfour Sanon and was 30 years old. She had 3 other children.

Group 4: Masons and Laborers

This was a focus group composed of 5 men who are masons and laborers. They were doing their daily work when they were asked to participate. All were willing, and all members of the group participated, though the younger men were more timid and allowed the older men to speak more. The group leader encouraged participation from all group members.

The members of the group were as follows: A 41 year old man who is legally married with 5 children, a 17 year old young man without any children, an 18 year old young man with no children, a 32 year old man with 3 children, and a 24 year old male with no children. Some of the men volunteered that they had been tested for syphilis before and that they were all negative. One said that he got the test before marriage, because it is compulsory for legal marriages.

Themes:

What is syphilis? How does one get it?

All groups agreed that syphilis is a sickness or a “contagious illness.” The rural prenatal group said that they did not know how a person gets it, but all other groups recognized it as a sexually transmitted disease that can be passed bi-directionally. Two of the groups said that syphilis is a “mikrob” (microbe) that goes into the body through the vagina and gets into the blood. It is seen as an infection in the bloodstream. The general women’s group made a sharp distinction between infections in the bloodstream, ie. syphilis, AIDS, herpes zoster, and local infections of the “canal”, i.e. Gonorrhea, trichomonas.

The general women’s group added that a man can get syphilis from “sitting on a hot rock” (traditionally thought to be the cause of gonorrhea). Overall, there were

no references to magic or voodoo as a cause of syphilis in any of the groups, and the men denied it as a cause when specifically asked.

What are the symptoms of syphilis?

All groups agreed upon rash or “skin eruption” as a symptom of syphilis for both men and women. For two groups, this skin eruption was thought to be pruritic. Two of the three women’s groups said that vaginal itching and discharge alert a woman that she has syphilis, and one group said that a man may have a penile discharge from it. One group mentioned ulcers and hemorrhage as additional symptoms.

The men’s group had a unique view of the symptoms of syphilis. “It can make you ‘manke (lack) san (blood)’ (a word meaning anemic, or not having enough blood), thin, frail, and ‘soft’. It can make you cough, feel short of breath, and lose weight. It can make you feel tired or simply not feel the same.”

How Serious Is Syphilis?

Two of the groups felt that a person can die from untreated syphilis, and one group added that it can “putrefy the birth canal.”

How is Syphilis Treated?

Three of the four groups thought that syphilis is a curable illness. One group, the rural prenatal group, said that there is no treatment for it. Of those who felt thought syphilis is treatable, all viewed medical treatment as an option, and some, namely the men’s group and the urban prenatal group, saw it as the only possibility. The women’s groups felt that antibiotics were the best medical treatment for syphilis, while the men named “salicylates”. Antibiotics suggested included “a shot”, ampicillin, amoxicillin, and tetracycline. They felt that these medications had to be

taken systemically, and locally applied antibiotics would not be helpful. The general women's group thought that there are different antibiotic treatments for males and females. A woman has to take ampicillin and amoxicillin, while a man has to take three drugs, ampicillin, amoxicillin, and tetracycline. Only if the medications are taken correctly will the person be cured. One of the men in the men's group suggested that salicylates have to be rubbed on the skin to cure syphilis. "This will make the person hot and sweaty and he/she will get better."

Three groups discussed the use of herbal remedies in the treatment of syphilis. The men's group said that herbal remedies exist, but they felt that they only temporarily relieve symptoms but do not provide a cure. Thus, one has to go to the medical doctor for a true cure. The urban prenatal group did not think that herbal remedies were at all helpful for syphilis. One woman in the general women's group suggested a leaf cure, "barikad vole", or "barricade the thief." This leaf has to be made into a tea and drunk all day long "until the vaginal discharge clears up." A second woman told of a treatment for syphilis she had seen as a child. "Old people, when they have syphilis, take a bar of white soap that they wash clothes with, they beat it with water and make soapy froth. They drink it to cure syphilis. They also need to drink a lot of coconut juice. These are consumed cold, never hot."

Maternal-child transmission of syphilis

All groups recognized that syphilis can be vertically transmitted. The rural prenatal group told a story to illustrate this. "There was a lady in our community who had syphilis. She kept getting pregnant, but the babies kept dying inside of her. This happened many times. Then she came here to the prenatal post and they sent her to

Jeremie to be treated. Now she has a living child.” One group, the general women’s group, suggested that maternal-child transmission occurs when a woman who has the sickness travels a long distance and is very hot and then sits on a cold rock or floor. The COH prenatal group had a more biomedical understanding of transmission and felt that the baby gets it from the mom’s blood as it circulates to the baby. This group, when specifically asked, did not think that syphilis could be transmitted through breast-milk.

Manifestations of congenital syphilis in the baby listed by the groups included skin that is in bad shape, itchy skin, “pinched skin”, “different eyes”, blindness, persistent head sores, vaginal infections, fussiness, colic, and preterm birth.

Syphilis and AIDS

Two of the four groups felt that untreated syphilis leads to AIDS. Three of the groups had members who felt that syphilis and AIDS are the same disease. One woman said that “Untreated syphilis leads to AIDS.” One group, the urban prenatal group, recognized them as different saying that “AIDS cannot be treated, but syphilis can.” Some members of the men’s group differentiated them saying “If a person has syphilis he can go longer without symptoms if he is not treated. However, if a person has AIDS, this kills him very quickly.”

Prevention of syphilis

Only one group, the urban prenatal group, were asked prevention of syphilis. They said that it is preventable if people have only one sexual partner or if they use condoms. Condoms must be worn with all partners.

Group Discussion with HHF Nurses

This was a group interview held with HHF nurses (approximately 20) of varying ages and levels of experience. They were attending the monthly staff meeting. The focus of the interview was why syphilis tests are sometimes not done or are deferred for later visits.

One reason for not doing a syphilis test was lack of time. A second reason offered was that the test was actually done, but the result was written only on the woman's personal health card and not on her clinic record or vice versa. Thus it was done, but just not properly recorded. One person emphatically commented, "It's simply professional negligence! Deferring for one visit is one thing, but to defer for many visits is simply negligence!" Another possibility offered was that there often were not enough syphilis tests, either because the staff forgot to bring them altogether or because there were more women at the clinic than they had expected. Most of the group agreed that money has been a big issue. In the past, the women used to have to pay 25 Gourdes (65cents US) for the blood tests. They would have to pay it right before they had the test done. A lot of times women would just say that they didn't have the money. However, in July of 2006 a new system was implemented so that 25Gourdes is the total fee for the whole visit, including any bloodwork or medicines received. "Even if a woman can't pay the whole 25 Gourdes, we will take the 10 that she can pay us and give her the care anyway."

The question was posed of "How do you triage when you don't have enough tests? Who gets tested?" The first reaction was that "The protocol says that a woman should be tested on the first visit in the first trimester, so that's who I would give the test to!" Another disagreed and said that he would give it to the woman later in

pregnancy, because they might not get the chance to see her again. However, there was some controversy regarding this statement because “If you’ve waited that long, then the baby already has syphilis, and it won’t do anything to help her.” Another female nurse offered that she would make any woman who had previous stillbirths or miscarriages the first priority. Another said that after this he would choose to test someone who is symptomatic, if they have a skin eruption for example.

A final comment by one of the staff-members was, “I think that you will see a change in the number of women tested. We have made some recent changes, such as the change in the payment, and also we now have one person in charge of all of the tests, and we have appointed one person to be in charge of keeping all of the records for the women who are positive that we send in to Jeremie for a true RPR and an HIV test. There will definitely be a change.”

Quantitative Data

The following sections contain the results of the quantitative data collected from a variety of sources.

Description of the Villages

As mentioned in the methods section, five villages were selected for analysis. Table 6 describes the characteristics and population of each of these villages. It represents the overall demographic characteristics of the five villages selected for quantitative analysis. It shows the total and percent of males and females, women of childbearing age, and pregnancies in the previous year (2006).

<u>Village</u>	<u>Total # People</u>	<u>Total Males</u>	<u>Total Females</u>	<u>Women of Childbearing Age</u>	<u>Pregnancies in Previous Year</u>
Village 1	2541	1309(52%)	1232(48%)	519(20%)	77(3%)
Village 2	3164	1524(48%)	1640(52%)	844(27%)	43(1.4%)
Village 3	1679	800(48%)	879(52%)	424(25%)	30(1.8%)
Village 4	2099	1043(50%)	1056(50%)	525(25%)	41(2%)
Village 5	2675	1269(47%)	1406(53%)	702(26%)	39(1.5%)

Table 6. Village Characteristics

PHACT Dataset

Information from a total of 507 prenatal records from the 5 selected villages for the years of 2004-2006 was entered into PHACT. Figure 18 shows the distribution of the number of women from each particular village. Figure 19 shows the distribution of the number of women from each zone. Village 1 is in one zone, villages 2 and 3 are in zone 2, and villages 4 and 5 are in zone 3. The number of women in each zone is approximately equally distributed.

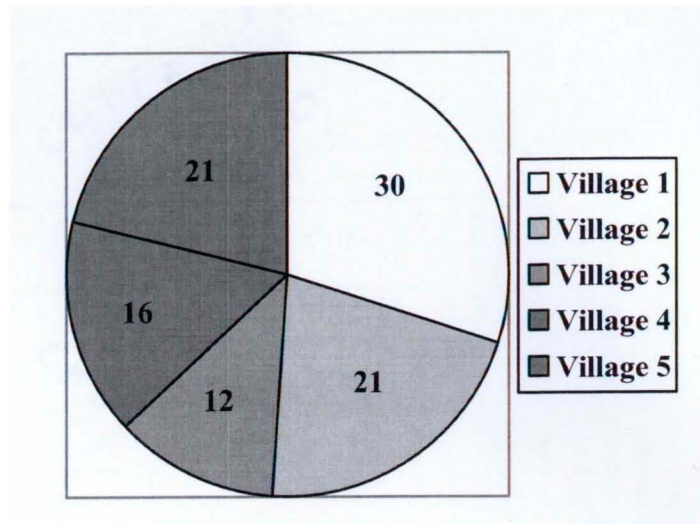


Figure 18. Percent of Women from Each Village

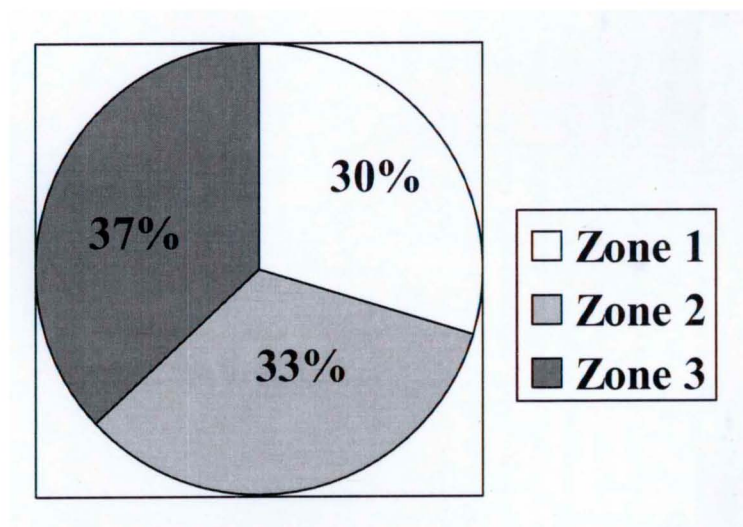


Figure 19. Distribution of Number of Women from Each Zone

Figure 20 shows the percent of women tested and not tested for syphilis in each zone. A chi-square cross-tabulation was done, and a significant difference was detected in the proportion of women tested and not tested between zones (Chi Square=12.94; P=0.002).

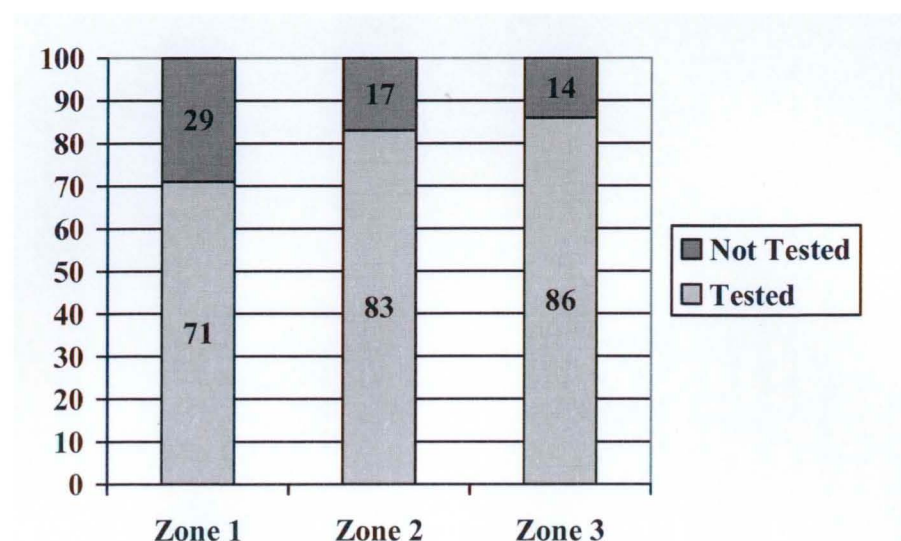


Figure 20. Percent of Women Tested and Not Tested by Zone

Figure 21 examines the outcome of the syphilis tests for all women tested. The relationship is looked at by zone. A chi-square cross-tabulation was done to detect differences in the proportion of positive and negative women between zones. It shows that there was a trend in regional variation.

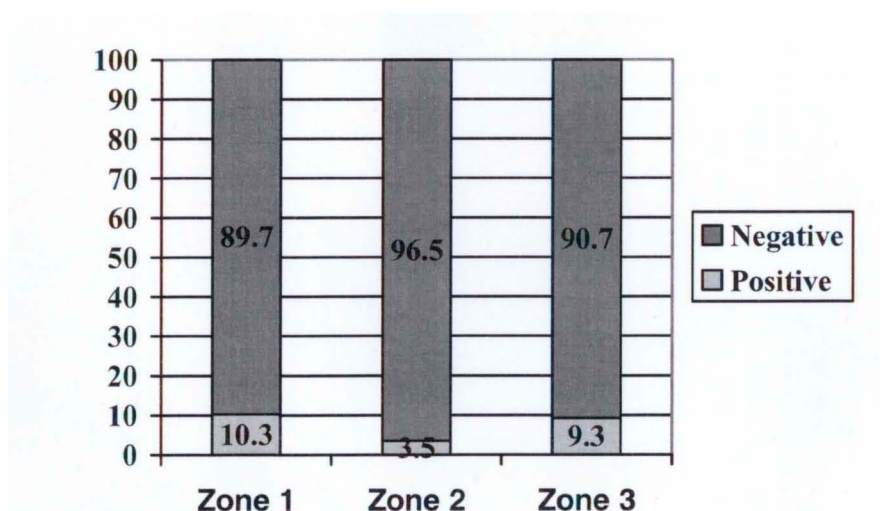


Figure 21. Outcome of Syphilis Testing by Zone

In Table 10 the number of syphilis positive women for each village for the years 2004-2006 are compared with the numbers for the years 2001-2003 (see Table 23 in “Other Data Sources” section of quantitative results).

Figure 22 demonstrates the relationship between stillbirths, miscarriages, and neonatal deaths (all represented by one data point in the dataset) and syphilis. A Chi-square cross-tabulation was run and it detected a significant difference (Chi Square=16.444; $P<0.0001$) in the number of adverse birth outcomes in the syphilis positive and negative groups. There were 6 adverse outcomes in the syphilis positive group, representing 19.4% of the group. There were 13 adverse outcomes in the negative group or 3.4%.

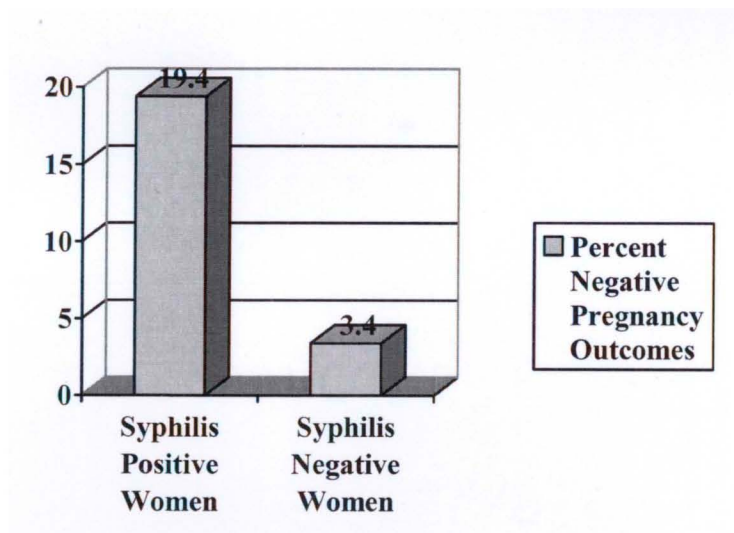


Figure 22. Relationship between Syphilis and Adverse Pregnancy Outcomes

In order to examine the pregnancy stage and timing of the syphilis test, several cases were dropped from analysis. These cases indicate the syphilis test was done up to 3 years before delivery or other data entry errors. Thus, only cases where the tests

were done within the 9 month span of pregnancy were selected for analysis. The number of days and weeks before delivery at which the syphilis test was done calculated, and then the pregnancy stage was inferred from this using a standard 40 week pregnancy. Of the 350 which remained, the mean number of days before delivery that the syphilis test was done was 106 (std dev 54 days), with a range of 2 days to 245 days. Thus, women were tested anywhere in the range of 5 to 40 weeks gestation, and most women were tested at around 25 weeks gestation, during the second trimester. Only 10.7% of women were tested in the first trimester, 60% were tested in the second trimester, and 29% were tested in the third trimester. Figure 23 shows the percent of women tested in each trimester.

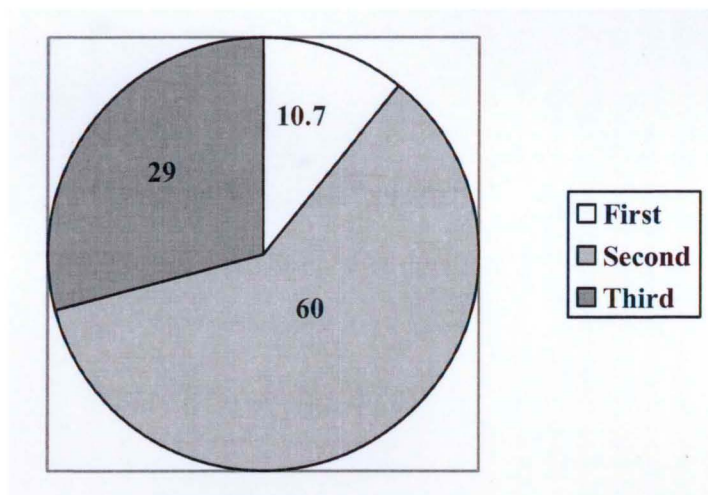


Figure 23. Percent of Women Tested for Syphilis in Each Trimester

Of the women who had positive syphilis tests (N=24), 8.3% were tested in the first trimester, 45.8% in the second trimester, and 45.8% in the third trimester. Figure 24 gives a graphic representation of this data.

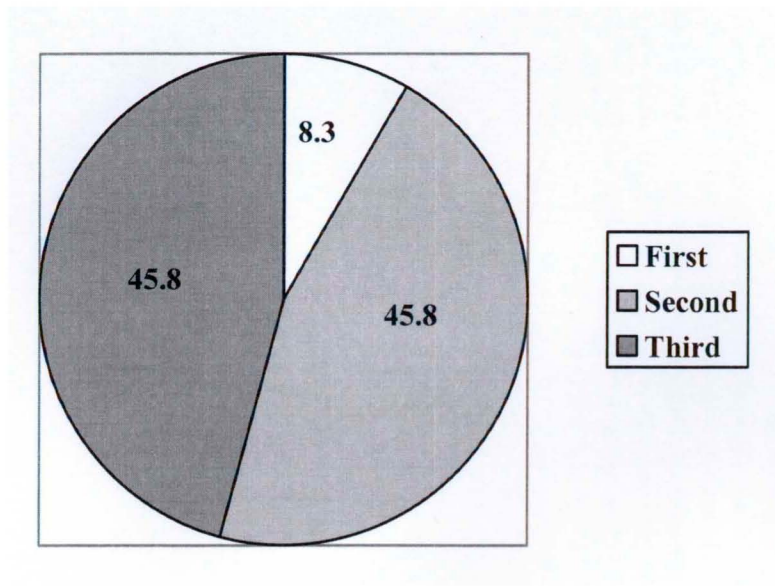


Figure 24. **Percent of Syphilis Positive Women Tested in Each Trimester**

Of the 6 syphilis positive women who had a miscarriage, stillbirth, or neonatal death, data on the time before delivery at which the syphilis test was done was available for 5 of them. One of the women was tested less than 30 days before delivery. The other 4 women were tested at 32, 55, 78, and 143 days before delivery. This represents 4 weeks, 7 weeks, 11 weeks, and 20 weeks before delivery.

If a woman is tested and treated for syphilis less than 30 days prior to delivery, there remains a significantly elevated risk of congenital syphilis in the infant. Thus, the number of women tested (and treated) less than 30 days before delivery in this sample was examined. Of the 350 women included in this analysis (exclusions as above), 37 (10.6%) were tested less than 30 days before delivery. Out of these 37 women, eight (19%) of these were less than 1 week before delivery. Three (10.7%) of these women ended up having positive tests.

The time during gestation a woman comes for prenatal care is important for interpreting the above statistics. Of the 507 women, data on the date of the first prenatal visit was available for 442 women. A 40 week gestation was assumed in calculating the gestational age at which the first prenatal visit occurred. The time of the first visit ranged from 1 week to 40 weeks. The mean time of the first prenatal visit was 23 weeks (std dev 7.8 weeks). The following figure shows the percent of women that came for their first prenatal visit in each trimester, with 0-14 weeks defining the first trimester, 15-27 the second, and 28 through delivery the third.

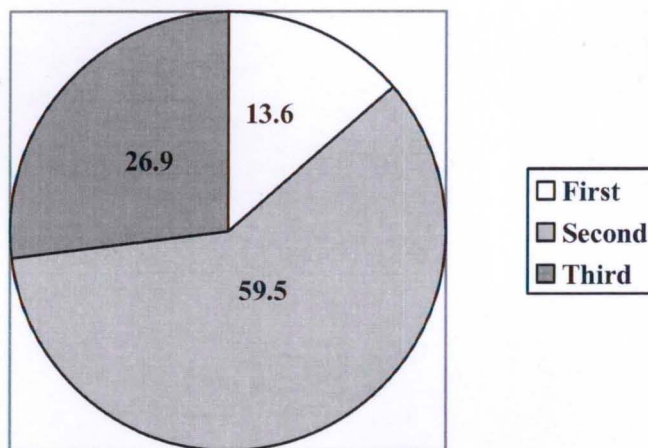


Figure 25. First Prenatal Visit by Trimester

The total number of prenatal visits that a woman attended ranged from 1 to 9. To account for errors in data entry, any woman with more than 9 visits was not selected for analysis, since it would be virtually impossible to have more than 9 visits during a pregnancy because prenatal posts are held only once a month. The average

number of prenatal visits per woman was 3.8 (std dev 1.8 visits). Ten percent of women were seen only once, while 2% were seen 9 times; 77% of women were seen 3 or more times, meeting the minimum guideline set by that Haitian Ministry of Health.

In addition to examining the gestational period when the syphilis testing occurred, it is also important to know at which prenatal visit the test was done. The following figure gives the percent of women that were tested at each respective visit. This figure shows that about 70% of women were tested at the first prenatal visit, as the syphilis testing protocol recommends. About 88% were tested at either the first or second visit, and the remaining 12% were tested at the third or later prenatal visit.

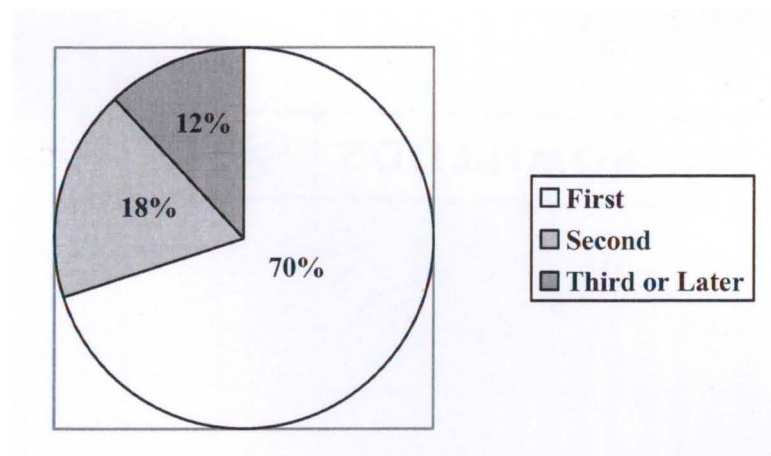


Figure 26. Visit at Which Syphilis Test was Done

As one would expect, there is a correlation between when during gestation a woman comes for her first prenatal visit and when during gestation the syphilis test is done ($p < 0.001$).

The data on age of a woman at the time of the pregnancy was in the PHACT database. The youngest woman was 14 and the oldest 49, which gives a range of 35 years of age. The average age was 28.65 years (S.D. 8 years). The relationship between age and syphilis status was examined using an Independent T-test, and it was not significant.

Of the 507 women in PHACT, 373 (72.3%) were listed as having a “husband”, a word which may mean legal marriage or simply cohabitation with a male partner; 143 (27.7%) did not have a man in the house. There was no relationship between syphilis positive and negative individuals and whether they were co-habiting with a male partner.

The socioeconomic status of the women in the study is represented by two variables—the number of rooms in their homes and the roof type. This is a scale devised by Bette Gebrian, the public health director of HHF, and is detailed in her PhD dissertation (Gebrian, 1993). More rooms and tin roofs are markers of higher socioeconomic status. Of the 507 women, 57 were missing data on the number of rooms in the home. For those for with information available, the number of rooms ranged from 1 to 5 with a mean of 2.49 (S.D. 0.72); 66% of women had a tin roof and the rest had a thatched roof. There was no relationship between either of these measures of SES and.

The birth weight file was merged into the PHACT dataset. Many cases did not have birth weights, so only 277 cases were available for analysis. Furthermore, since weights are taken at the first postnatal visit, and are not actual birth weights, cases were selected for analysis from these 277 only if the weight was measured

within 9 days of delivery. This left 244 cases for analysis. Of these cases, the mean weight was 3.4kg (std dev 0.4kg) and the range was 2.5kg to 5.5kg.

Since maternal syphilis can cause IUGR and low birth-weight, the relationships between syphilis status of the mother and the weight of the baby at the first visit were analyzed using an independent T-test. Weights were available for the babies of only 11 of the syphilis positive mothers. There was no relationship between birth-weight (actually weight at first visit) and maternal syphilis status.

“Past Birth Outcomes” Dataset

The following data comes from the “Past Birth Outcomes” dataset. This dataset was taken from the pregnancy history section of the paper prenatal records. Information for 29 (36%) syphilis positive women and 52 (64%) syphilis negative women was entered. The distribution of the women in the dataset among the 5 villages was similar to that of the PHACT dataset. Table 7 examines the relationship between syphilis and past pregnancy outcomes. A Chi Square analysis was done and a significant relationship was seen between a history of multiple stillbirths and positive syphilis test in the current pregnancy (Chi Square=4.529; P=0.033). No other significant relationships were seen. Because many of the numbers were small, a bigger sample size is needed to more effectively analyze these relationships.

Past Birth Outcomes	Syphilis + N(%)	Syphilis – N(%)	Chi Square	P
Ever Had a Spontaneous Abortion	4 (13.8%)	5 (9.6%)	0.329	0.566
Ever Had a Stillbirth	6 (20.7%)	4 (7.7%)	2.906	0.088
Ever Had Neonatal Death	4 (13.8%)	3 (5.8%)	1.518	0.218
Ever Had Infant Death	7 (24.1%)	11 (21.2%)	0.96	0.757
H/o of Multiple Stillbirths (2 or more)	4 (13.8%)	1 (1.9%)	4.529	0.033

Table 7. Past Birth Outcomes and Syphilis Status

In addition to the relationships listed in table 7, the relationship between syphilis status and number of gestations and living children was analyzed using the 2-tailed T-test for independent samples. Table 8 shows the results. Furthermore, the relationship between number of gestations and number of stillbirths was analyzed using bivariate correlation, and a significant relationship was found (Pearson R 0.547; $p < 0.001$). This data showed that there was a significant relationship between syphilis status and mean number of gestations, but this was likely mediated by the number of stillbirths.

<u>Variable</u>	<u>Syphilis +</u>	<u>Syphilis --</u>	<u>F</u>	<u>P</u>
Mean number of Gestations	5.21	4.02	9.106	0.003
Mean number of living children	2.97	2.63	0.692	0.408

Table 8. Syphilis and Mean Number of Gestations and Living Children

Other Data Sources

The following data tables are provided as a point of comparison for the data generated from PHACT. It allows comparison between syphilis in the urban and rural environments. It also allows one to look at the change in syphilis prevalence

over time in each of these environments. Furthermore, it shows the percent of positive women that are treated as well as the number of partners treated, information that is important when considering the current epidemiology of syphilis. The data comes from composite reports created by the HHF staff and used in evaluation of their work.

Table 9 shows the data for the urban and rural programs combined for the years 2003 through 2006. As mentioned, the urban program uses an RPR test, while the rural program uses a rapid treponemal assay.

<u>Year</u>	<u>N of tests performed</u>	<u>N of positive tests</u>	<u>Percent Positive Tests</u>
2003	1510	120	7.9%
2004	1899	148	7.8%
2005	3369	254	7.5%
2006	3408	142	4.2%

Table 9. Urban and Rural Combined Syphilis Statistics For Pregnant Women by Year

Separate syphilis data for the rural and urban programs was available only for the years 2005 and 2006. Prior to these years, rural and urban data was combined when creating the summary reports. Table 10 shows the prevalence of syphilis in the rural milieu. This data is for all of the rural villages combined and thus allows one to compare the PHACT data, which is only for 5 villages, with that from the entire rural program. Table 11 contains data for the urban program for the years 2005 and 2006, and it allows one to compare the prevalence of syphilis at the rural clinics with that of the urban clinic.

<u>Year</u>	<u>N of Tests Performed</u>	<u>N of Positive Tests</u>	<u>Percent Positive Tests</u>
2005	1677	164	9.7%
2006	1769	77	4.3%

Table 10. Rural Syphilis Statistics For Pregnant Women by Year

<u>Year</u>	<u>N of Tests Performed</u>	<u>N of Positive Tests</u>	<u>Percent Positive Tests</u>
2005	1692	90	5.3%
2006	1639	65	3.9%

Table 11. Urban Clinic Syphilis Statistics For Pregnant Women by Year

Table 12 contains information about the 5 different counties served by HHF. It shows how many positive tests there were for each county, how many of these women were treated (ie. Got the first dose of penicillin, there is no information available on the second dose), and the number and percent of partners treated.

<u>County</u>	<u>N of tests</u>	<u>N (%) Positive</u>	<u>N (%) Women Treated</u>	<u>N (%) Partners Treated</u>
JEREMIE	533	27(5%)	27(100%)	23(85%)
MORON	478	24(5%)	24(100%)	20(83%)
DAYERE	472	14(3%)	14(100%)	12(86%)
ROSEAUX	129	7(5.4%)	7(100%)	7(100%)
BONBON	157	2(1.3%)	2(100%)	2(100%)
TOTAL	1769	74(4.2%)	74(100%)	64(86%)

Table 12. 2006 Number of Women and Partners Treated in Five HHF Counties

Discussion

Prevalence of Syphilis

The overall prevalence of syphilis in the five villages for the years 2004 through 2006 was 7.6%. There seemed to be some regional variation of syphilis positivity, with Villages 2 and 3 (i.e. Zone 2) having a much lower prevalence (3.5%) than village 1 (zone 1, 10.3%) or villages 4 and 5 (zone 3, 9.3%), although this was

only a trend ($P=0.08$). The statistics from 2001 through 2003, the years just prior to those selected for this study, showed a different trend (see table 10 in results). The different direction of these trends likely is due to the small sample size and due to chance. A larger sample size is needed to look more in depth at regional variation of prevalence of syphilis.

What is Syphilis

The concept presented in the key informant interviews and focus groups that there is a distinction between infections of the blood and local infections is an interesting one. When thinking about syphilis versus gonorrhea, for example, it makes a lot of sense. The most often cited symptom of syphilis was a generalized, itchy, rash. It makes sense, and indeed is true, that the causative agent, or “mikrob”, must distribute through the entire body via the blood in order to cause such a rash. The syphilitic chancre was not mentioned in any of the groups or individual interviews as a symptom of syphilis, so it is unclear how this would fit into the theory that syphilis is a “blood infection.” Gonorrhea, on the other hand, manifests itself by a vaginal or urethral discharge and usually has no systemic symptoms. Thus, this would be thought of as a localized infection amenable to local treatments, such as vaginal suppositories or diuretic teas that “clean the canal.”

Causation

Although many of the men and women recognized syphilis as a sexually transmitted disease, there were other theories of causation. The idea that a person can get sexually transmitted diseases from temperature changes has been documented in Haiti previously. A 1996 study conducted in Cite Soliel, Haiti found this same concept expressed during focus groups. “They said that an STI could be contracted

during sexual intercourse or as a result of abrupt body temperature changes. For example, a genital discharge can develop when a person who feels very hot sits on a cold stone or when one feels cold and sits on a hot object” (Desormeaux, 1996) . This was not specifically related to syphilis, but rather to genital discharge. However, since many of the women cited vaginal itching and discharge or penile discharge as symptoms of syphilis, this may be why they think this is a way one gets syphilis.

The possibility of spiritual or magical causation of syphilis was one that was not widely held by those interviewed. One of the community health workers said that he had heard that people in his community think that a person can get syphilis from having a “trap” put on them, but otherwise none of the other individuals or groups mentioned this idea. This may have been due to hesitancy in discussing supernatural causation with medical practitioners and outsiders (the author), or because of true lack of belief. From the discussions, it seems that some people may believe more strongly that this might occur with AIDS, but that it is not an established theory of causation for syphilis. Also, it might be a generic theory that applies to many different sexually transmitted diseases.

Symptoms of Syphilis

It is interesting that no individuals or groups mentioned the classic syphilitic chancre as a symptom. This may have been because most of the people interviewed were women, and women are more likely not to see a chancre if they have one, although they might see one on a male partner.

The information from the focus groups and individual interviews showed a blending of the symptoms of syphilis, other STI's, and even tuberculosis. One common misperception is that a person gets a genital discharge from syphilis.

Several women cited what seem to be the characteristic symptoms of AIDS, i.e., weight loss, diarrhea, and weakness, as symptoms of syphilis. One man recounted the symptoms of tuberculosis—cough, shortness of breath, weight loss, malaise—as symptoms of syphilis. Although this understanding demonstrates a lack of education about the symptoms of syphilis and STD's in general, it is not necessarily a problem. If a person recognizes that they have an illness, i.e., that they have a vaginal discharge or diarrhea, and this problem causes them to seek medical attention, then this puts the diagnosis and administration of proper treatment in the hands of the clinician. A problem might arise, however, if a person associates a set of symptoms with a disease that they do not think requires medical attention or that they feel is not that serious. In this case, a disease, such as syphilis might go unrecognized and untreated and further spread in the community. Thus, basic education about the symptoms of syphilis and other STI's is an important element of the control of these diseases in a population.

Though the question was not specifically asked, none of the men or women interviewed volunteered that a person may have syphilis and be asymptomatic. This may have been due to the way the questions were asked, i.e., “How does a person know they have syphilis?” or because of a lack of knowledge. In the rural HHF situation, where there is routine prenatal screening for syphilis and a flat fee for all services, including syphilis testing, self-referral for testing is not really an issue. However, it is unclear how a woman makes the decision to seek prenatal care and when she should come for the first visit. In a censused village, presumably all women have prenatal care and are prompted by the health agent if they do not come. However, women from non-HHF villages often come to the posts for care as well.

What motivates this? If a woman from an un-censused village knew that she could be asymptomatic and still have a disease that might hurt or kill her baby, might this motivate her to seek testing and treatment? Of course, this is only speculation, but it lends credence to the idea that improved education about syphilis and STD's may be valuable for rural Haitian communities.

Treatment of Syphilis

From the discussion with the HHF medical director, it seems that most cases of syphilis that are seen in the rural HHF zones are of the latent type, and most of these are of unknown duration. Thus, the HHF protocol of 2 doses of Benzathine PCN 2.4 million units is not adequate according to CDC standards. It is the author's recommendation that HHF consider a medical evaluation of the syphilis treatment protocol, and that consideration be given to changing the treatment to 3 doses of PCN for women with syphilis of unknown duration or late syphilis, and only one dose if there are signs of primary or secondary syphilis.

Although quantitative data is not available for how many women are given their second dose of PCN, partner treatment, which is 86% may stand as a proxy since the woman and the partner return together for treatment. The percentage of women who receive the second dose is probably even higher according to the nurses, who say "all women" come back for the second dose or are found by the health agent. Thus, it seems that the ability of the women to be followed-up would not be a major factor in deciding to increase the PCN regimen to 3 doses. Cost and availability of personnel may be limiting factors, however, and the costs versus benefits must be carefully weighed by HHF leadership before making a decision.

The community understanding of the treatment of syphilis was varied. Although one group felt that syphilis is an incurable illness, all others felt that it was treatable, and that medical treatment was an option. The women understood that systemic antibiotics were the necessary medical treatment, though they were unclear which ones. Again, likely they were confusing the treatments for other sexually transmitted diseases or infections with that of syphilis. The men had less of an understanding of its treatment, but felt that it had to be taken care of by a medical doctor. Their suggestion of salicylates that have to be rubbed on the body to make the person sweat may be linked in part to the idea that syphilis can be transmitted by drastic body temperature changes.

Although herbal remedies did come up in conversation, overall they appeared to be secondary treatments. This might not truly be the case, however, since one might be reluctant to discuss one's use of herbal remedies with a medical practitioner. The herbalist himself, however, called Penicillin a "miracle cure" for syphilis and said that he would send any patient with syphilis to the medical doctor for care.

Maternal- Child Transmission of Syphilis and Congenital Syphilis

The CDC developed a surveillance case definition for congenital syphilis in 1988 in order to help with the identification and reporting of congenital syphilis. In this definition, all infants born to mothers with syphilis who are untreated or inadequately treated during pregnancy are considered potentially infected and at risk for the complications of congenital syphilis. Inadequate treatment was defined as treatment with a non-penicillin therapy or treatment less than 30 days before delivery (CDC, 2003). Asymptomatic infants and syphilis related stillbirths (defined as a

stillbirth in a syphilis positive woman who was untreated or improperly treated), as well as infants with any laboratory or radiographic evidence of congenital syphilis, are also included in the case definition. This case definition can be used to calculate the rate of congenital syphilis, which is defined by the CDC as number of cases of congenital syphilis per 100,000 live births (CDC, 2004).

Using the CDC case definition, the rate of presumed cases of congenital syphilis can be calculated for the villages studied, and this rate can be generalized to the surrounding regions. There were 3 cases of congenital syphilis that met the CDC criteria in the sample of 410 women tested. Since the rate is given as number of cases per live births, the number of stillbirths for the group (N=19) was subtracted from the 410, thus leaving a denominator of 391. This gives a rate of 767 cases per 100,000. This is much higher than in the United States, which had a rate of 11.2 cases per 100,000 in 2002 (CDC, 2004). This rate is only an estimate, and it is likely an underestimate, since there is no data available on symptomatic cases of congenital syphilis, and blood work and radiographs are not done on infants born to syphilis positive mothers. Nevertheless, it suggests that congenital syphilis is a big problem in Jeremie and its surrounding communities

It is very important that congenital syphilis identification and treatment be improved. In the ideal situation, the CDC guidelines for evaluation and treatment of possible cases of congenital syphilis should be followed. This, in many cases, would involve such things as x-rays, lumbar punctures, blood tests, and multiple day treatments with intravenous antibiotics. In a resource and personnel limited environment, such as rural Haiti, most of this would be extremely difficult to achieve. Thus, guidelines need to be adapted to fit the context.

One possible way to improve the identification and treatment of congenital syphilis would be to do serologic testing on infants of seropositive mothers and treat appropriately based on these results. This would include referral of mothers and infants to Jeremie for serologic testing using RPR or VDRL in the following scenarios: a) If the mother had syphilis that was untreated or inadequately treated (i.e. did not receive follow-up dose of PCN, or was treated less than 30 days before delivery) during pregnancy; or, b) If the mother had syphilis that was properly treated early on, but the infant has signs suggestive of congenital syphilis. The infants should then be treated according to CDC guidelines based on the clinical scenario and the blood test results (Appendix 1). Furthermore, HHF should consider treating all babies born to mothers that had a positive syphilis test during pregnancy, even if it was treated adequately early in pregnancy and the mother had no signs of relapse, with a single dose of Benzathine Penicillin G 50,000 units/kg/dose IM in accordance with CDC guidelines (See appendix 1: Scenario 3) Furthermore, mothers who come for a postnatal visit who were not tested in pregnancy should be tested, and the baby examined and treated according to the recommendations.

The implementation of these measures could occur in the following ways. Both the prenatal and postnatal records should be present at the postnatal nursing consultation. The nurse should look through the woman's prenatal record and personal health card.

Scenario 1: If the mother has never had a syphilis test, she should have one at that visit. If it is positive, then she should receive the appropriate treatment for herself, and the baby should also receive a single dose of Benzathine penicillin G on that day. The baby should be thoroughly examined for signs of congenital syphilis. Both the mother and baby should be referred to Jeremie for an RPR (and HIV test for mother) and appropriate treatment based on the above suggestions.

Scenario 2: If the mother did have a syphilis test and it was positive but there is no evidence of treatment or if there is evidence of inappropriate treatment or relapse, then both the mom and baby should receive a dose of penicillin, the baby should be examined, and the mother and baby should be referred to Jeremie for an RPR and appropriate treatment according to the CDC guidelines (Appendix 1).

Scenario 3: If the mother had a positive syphilis test during pregnancy, was appropriately treated >4 weeks prior to delivery, and the baby has no signs of congenital syphilis, the baby should receive a single dose of Benzathine PCN G on that day.

Such an implementation would require training of HHF staff about the signs of congenital syphilis and the treatment protocol. The costs of this protocol would be for additional penicillin for treatment of the babies, testing materials for the maternal and infant RPR/VDRL, and the difficulty of the long journey into Jeremie that some mothers face. Also, the only place where a child can receive IV penicillin is at the local government hospital. This would involve additional costs and difficulties for the family. The necessary antibiotics for IV treatment (Aqueous Penicillin G or Procaine Penicillin) may also be unavailable or available only at a high cost at the hospital.

Recognizing that the costs of referring women and infants to Jeremie for testing may be difficult, and mothers may choose not to go, an alternative plan is also suggested by the author. This plan would involve presumptive treatment of all asymptomatic infants born to mothers with a positive syphilis test at any time during pregnancy regardless of whether the mom was treated or not. The treatment would be a single dose of Benzathine Penicillin G 50,000 units/kg/dose IM. Any symptomatic infants should still be referred to the local government hospital for evaluation and IV antibiotics. Furthermore, any mothers who were not tested in pregnancy should be tested and appropriately treated at the first post-natal visit. The implementation of

this protocol would also involve training HHF staff in the recognition and proper treatment of congenital syphilis as well as reviewing the appropriate congenital syphilis treatment protocol with the local government hospital physicians. The costs of this plan would be those of the additional doses of Penicillin for infant treatment and the long journey to Jeremie and hospital bill for families of symptomatic infants. This protocol is obviously not ideal, as some cases of congenital syphilis needing IV treatment might be missed. However, it would be a step in the right direction.

In looking at HHF staff involvement with cases of congenital syphilis, the community health agents are the first responders when it comes to identifying and referring cases of congenital syphilis in the rural environment, since the nursing postnatal visit may not occur up to a month after birth. KOMBIT has put in place a plan for all health agents to visit each new baby within 72 hours of birth. All three health agents had a fairly accurate view of what a case of congenital syphilis might look like, with the exception that one health agent described a picture of neonatal conjunctivitis and said that it could be caused by syphilis. Overall, they seemed confident in their ability to recognize and refer congenital syphilis.

The congenital syphilis picture identification exercise with the HHF nursing staff was valuable. Although it can be hard to identify diseases from two dimensional pictures, and the exercise may have been tainted by the fact that some of the staff were aware that the author was conducting a study on syphilis, it was still a helpful portion of the study. It established the knowledge and attitudes of the nurses about what sorts of signs and symptoms they would expect a baby with congenital syphilis to have. It also demonstrated the index of suspicion that they had for the diagnosis of congenital syphilis. For example, syphilis has never been shown to cause congenital

malformations. Nevertheless, two of the staff had the impression that clubfoot or polydactyly could be caused by syphilis. Furthermore, two of the four nurses erroneously felt that syphilis is a cause of neonatal conjunctivitis. One of the nurses had congenital syphilis in the differential for only one of the pictures, indicating a low index of suspicion for the disease. Overall, this exercise demonstrates the need for continuing education on congenital syphilis with the HHF nursing staff to aid in identification and proper treatment of cases.

The men and women in the groups and individual interviews seemed to have a good understanding that syphilis can be vertically transmitted and that this can be harmful for a fetus. Again, drastic temperature changes were part of the theory of vertical transmission for one of the groups, i.e., maternal-child transmission occurs when a mother with the disease is hot and sits on a cold rock. Others had a more biomedical understanding, feeling that the blood circulates from mother to baby and carries the disease with it. Overall, many of those interviewed had a good grasp on the possible manifestations of congenital syphilis, with skin conditions being the most commonly cited. Interestingly, only one group mentioned stillbirths or miscarriages as the outcome of maternal syphilis, even though this is likely the most common outcome. Continued and improved education of community members about the deleterious effects of maternal syphilis may increase self-referral for testing and treatment of women and identification and treatment of affected infants.

Syphilis and HIV/AIDS

Members of all of the focus groups, except for one, and several of the individual interviews, felt either that AIDS and syphilis were the same, that AIDS and syphilis were very similar, or that syphilis is just another name for AIDS. The

understanding that AIDS and syphilis are the same disease, or that they are very similar has not been seen in other studies. In the Cite' Soliel study, the female and male participants made a clear distinction between AIDS and other treatable STD's (Desormeaux, 1996). The group that clearly differentiated the two was the COH women's group. The most likely reason for this is the extensive education that women receive at the COH on STD's and other pregnancy related issues. Since viewing syphilis as an untreatable, uniformly fatal disease may have implications for a woman's willingness to be tested, to bring her partner for treatment, or on her partner's reaction to her positive test, it is important that there be improved community education on syphilis and STD's in general. Particular venues in which this education could be instituted or improved would be in the mothers' and fathers' groups, the education sessions held by nurses prior to the prenatal posts, and during the time when each individual woman is being tested. One useful tool for teaching, especially during pre and post test counseling, might be laminated cards with important counseling points for all HHF and dispensary nurses and Health Agents. Women also mentioned radio broadcasts, youth groups, and the marketplace as places they learned about syphilis, so doing education via these modes and in these settings might be helpful, though possibly not realistic at this point in time.

An actual relationship between HIV/AIDS and syphilis does exist. Concomitant HIV and syphilis infections are common. Both infections have been shown to increase the acquisition of each other (Rompalo, 2006). Because of this, WHO recommends that all pregnant women who test positive for syphilis be referred for an HIV test. HHF should be commended for recently starting a new protocol in

the rural environment that addresses this issue. Now, all women who test positive with the rapid test are referred to Jeremie for a free RPR and HIV test.

Partner Treatment and Reaction

Table 10 in the results section gives the partner treatment rate for the cases of syphilis found in the rural zones for 2006. The rate of partner notification and treatment for index cases is comparatively high in HHF at 86%. Those who do not come were said to be out of town or in Port Au Prince by the nurses and health agents. Compared to 36% of partners treated in the 1996 Cite Soliel study (Desormeaux, 1996), HHF's numbers are commendable. This high rate of partner treatment is likely due to the heavy involvement of the community health agents in the process as well as the difference in culture and environment.

Partner reaction was not explored in depth in the focus groups or interviews with either the men or the women. However, the community health agents expressed their opinions about the issue. While one felt that there was never any discord in the couple when a woman is diagnosed with syphilis and brings her partner to the clinic, the other two said that sometimes they fight or get upset with one another. However, this usually does not lead to breaking the relationship or to violence. They emphasized that the men were usually happy to be treated, and that they did not feel like syphilis is a grave disease. In the Cite Soliel study, the men were asked how they would react if they were notified that their wives had an STD. Most of the men answered by making a distinction between AIDS and other curable STD's. In general the men felt that if their wives had a genital discharge or ulcer it would not be a problem in part because of the treatable nature of the conditions. However, one man said that if his wife had AIDS, he would kill her because she was probably seeing

other men and he did not want her to give it to them as well (Desormeaux, 1996).

Although there is no clear evidence at this point, the confusion of syphilis with AIDS by many could conceivably result in more severe partner reactions than if syphilis was understood for what it is, a treatable illness.

Problems with Testing and Treatment

Since early and universal prenatal screening has been shown to be an extremely successful and cost-effective way of preventing the detrimental effects of syphilis for both mothers and babies, it is important that HHF be vigilant about testing and treatment. Overall, 19.1% of women who attended a prenatal clinic at least once were not tested for syphilis. This is a problem, since the protocol states that all women are to be tested on the first visit. The highest number/percentage of women not tested was in Village 1, and the difference among the villages was significant ($p=0.002$). One possible reason that there were more women in Village 1 who were not tested might be because it is a newer village, only an HHF village since 2003, and thus the health agent is not as experienced. The health agents play a key role in the prenatal posts, in directing the flow of the clinic, and assuring that the different components are carried out. Thus, if he/she is new and less experienced, this might contribute to the problem.

Most of the time syphilis tests are being done later than recommended in pregnancy. As mentioned, the protocol is to test a woman on her first prenatal visit and in the first trimester. The women were tested, on average, in their 25th week, which is well into the second trimester. Furthermore, a significant number of women, 10.7% (N=37), were tested within 30 days of delivery. There is an elevated risk of having congenital syphilis even after maternal treatment if treatment occurs within 30

days of delivery. Almost one fifth of these 37 women were tested within one week of delivery, and 10.7% of these had syphilis. The reason that women are being tested late in pregnancy has to do both with the fact that on average they do not seek prenatal care until the 23rd week of pregnancy and also because testing is delayed until the second, third, or later prenatal visit for approximately 30% of women.

One of the problems mentioned by the nurses was that they often do not have enough tests for all of the women at the community outreach prenatal clinics. The number of women that come to a clinic on a particular day is rather unpredictable, and it can make it hard for the nursing staff to estimate how many tests are needed. The recent appointment of a staff member by HHF to be in charge of the tests may help with this situation in the future. One way of improving the situation would be for this person to track of the syphilis sent out, used, and returned each day or week. That way 150 to 200 tests could be sent out to each clinic, ensuring that there would be enough for everyone. During the clinic, the number of tests should be recorded and the excess returned and counted. This method will result in test availability for each clinic, no missed testing opportunities, and test accountability so that tests are not lost or misused.

Another problem with syphilis testing is that women often do not come for prenatal care until late in pregnancy. Reasons given for this during key informant interviews included lack of money, distance from clinic post, and lack of education. Late prenatal care is a problem that complicates not only syphilis testing, but all aspects of prenatal care, and it has no easy solution. Continued community education by health agents and nurses on the importance of early prenatal care may encourage women to come in earlier.

An important step in making a change in the proportion of women being tested would be to have an educational session for both the HHF nurses and Health Agents, possibly during their monthly staff meetings, about testing and treatment. This session should re-emphasize the detrimental effects of syphilis on pregnancy outcomes and the health of babies, the importance of testing on the first prenatal visit and preferably in the first trimester, the possible problems associated with delayed testing and treatment, a triage system for prioritizing testing when there are not enough tests, and the importance of recording test results on both the prenatal record and the woman's individual health card. Strategies for teaching the community about the importance of testing and treatment should be discussed as well.

Prevention of Syphilis

Prevention of syphilis was not a topic that was widely talked about in the interviews. The group that discussed prevention seemed to have a good knowledge of how to prevent it—by using condoms with all partners, and by having only one sexual partner. However, as discussed in the introduction, condom use is low. It may be even lower in rural areas compared to the urban because of lack of access. Furthermore, having more than one sexual partner, especially for men, is common. The Girl's Responsible Sexuality Soccer Program is one of the ways HHF addresses the issue of sexuality and sexually transmitted diseases with young women who are still in the process of forming the sexual patterns and habits that they will have during their lives. In this program HHF nurses and staff provide sexual education and encourage abstinence as well as personal protective measures. Responsible sexuality training is also provided to young men. Addressing the issue of protective measures

against syphilis and other STD's with adults might take place during mothers' and fathers' groups and pre and post-syphilis-test counseling.

Study Limitations

There are several limitations to this preliminary research on syphilis Haiti. The first is that only pregnancies that occur after a woman joins HHF are tracked. Furthermore, the inconsistencies in noting pregnancy outcomes in PHACT make it difficult to know important information such as the number of living children and stillbirths. A full pregnancy history is only kept on the paper copy of the prenatal record, and the extraction of this information is labor intensive. For this study, only a small fraction of the pregnancy histories for the non-reactive women was utilized due to the short research period.

Inconsistencies in the way that miscarriages, stillbirths, and neonatal deaths are tracked and the lack of verification between the many sources of information are also limitations. Death certificates are not always completed, especially for newborns and stillbirths, and there are errors in data entry. There is not always a clear distinction in the database between miscarriages, stillbirths, neonatal deaths, or infant death. Although the author attempted to compensate for these errors through extensive verification, the errors make it difficult to examine relationships between syphilis and miscarriage, stillbirth, and neonatal death, some of the primary outcomes of maternal syphilis.

One of the possible manifestations of congenital syphilis is premature birth. It is not possible in the rural HHF program to accurately determine whether a birth was premature or not. In many societies, recall of LMP has been shown to not be an

accurate method for determining the date of confinement, and it is probably less accurate in the rural environment of Haiti, where the concept of time is less defined. Furthermore, IUGR and failure to thrive are also manifestations of congenital syphilis. Newborns are not weighed at birth, but at the first postnatal visit. This visit may be as little as a few days from the actual birth or as much as a month or several months. Only weights measured within the first 10 days of birth were used in this research, which significantly decreased the sample size for the analysis. Thus, it was difficult to look at relationships between syphilis and low birth weight or IUGR.

Socioeconomic indicator data was not available for all subjects, only those who were part of HHF before 2001, when the last census was done. This may have decreased the power of the analysis of the relationship between syphilis and socioeconomic status.

No record is kept of whether a woman has received her second penicillin dose. It is assumed that she has if the partner is treated, as the partner and woman come back to the clinic together. It is not clear how accurate this proxy measure is, however, as a woman may return even if her partner does not and vice versa.

Summary of Recommendations

Program Recommendations for HHF Syphilis Program:

1. More vigilance is needed in testing pregnant woman for syphilis at their first prenatal visit and ideally during the first trimester.
 - a. Increase efforts in assuring that an adequate number of test strips and capillary tubes are available at each prenatal post by assigning a staff member to the task of distributing and counting the tests.

- b. Increase efforts to get the women to come for prenatal care as early as possible in the pregnancy through education and health agent participation.
 - c. Provide continuing education for nurses and health agents about the importance of syphilis testing and optimal timing of testing.
- 2. Improve consistency in tracking miscarriages, stillbirths, and neonatal deaths.
 - a. Appoint one staff member to the task of integrating the different datasets to achieve a unified, more complete record.
- 3. Improve HHF staff's ability to recognize and diagnose congenital syphilis through continuing education.
- 4. Improve education of patients about syphilis.
 - a. Discuss syphilis with each patient at the time they are being tested.
 - b. Use laminated note-cards with key points to be emphasized during pre and post-test counseling (See example in Appendix 4).
- 5. Consider a medical evaluation of HHF's current syphilis treatment policies so as to make them consistent with CDC Recommendations.
- 6. Consider testing and treatment of infants at risk for congenital syphilis.
- 7. Improve prenatal and postnatal record-keeping.
 - a. Provide staplers to the staff so that all prenatal and postnatal forms can be securely fastened.
 - b. Make sure that all documents are clearly identified with HHF number on each page.
 - c. Improve organization and filing of prenatal and postnatal records.

Recommendations for Future Study:

This study was an exploratory study of maternal syphilis in rural Haiti, so more in-depth research is needed to confirm and elucidate important relationships to inform the HHF Program in its syphilis education, testing, and treatment strategies.

This was study of maternal syphilis in the rural environment. Equally important would be an investigation of the urban environment. What are the differences in prevalence between the urban and rural clinics? What accounts for these differences?

Another exciting direction for research would be to congenital syphilis in depth. This could be facilitated by implementing the testing and treatment recommendations suggested by the author.

HIV rates in syphilis positive individuals have been shown to be higher than the average population and vice versa. The HHF patient base would be an ideal group of people in which to study these relationships.

Although unlikely, an endemic treponematosi s may at least partially account for the high rates of maternal syphilis sero-positivity. This might partially explain why there are few documented symptomatic cases of congenital syphilis. One way to examine this would be to test household members of each index case, as they would be likely to positive as well, and examine the epidemiologic and geographical patterns of positivity.

This thesis provides baseline information on several aspects of the problem of maternal syphilis in rural Haiti. The research has implications for changes in the HHF syphilis program, changes in national public health policy and for future research and interventions.

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Appendix 1

CDC STD Treatment Guidelines 2006:

Congenital Syphilis Treatment Guidelines [6].

Effective prevention and detection of congenital syphilis depends on the identification of syphilis in pregnant women and, therefore, on the routine serologic screening of pregnant women during the first prenatal visit. In communities and populations in which the risk for congenital syphilis is high, serologic testing and a sexual history also should be obtained at 28 weeks' gestation and at delivery. Moreover, as part of the management of pregnant women who have syphilis, information concerning treatment of sex partners should be obtained to assess the risk for re-infection. All pregnant women who have syphilis should be tested for HIV infection. Routine screening of newborn sera or umbilical cord blood is not recommended. Serologic testing of the mother's serum is preferred rather than testing of the infant's serum because the serologic tests performed on infant serum can be non-reactive if the mother's serologic test result is of low titer or was infected late in pregnancy. No infant or mother should leave the hospital unless the maternal serologic status has been documented at least once during pregnancy, and at delivery in communities and populations in which the risk for congenital syphilis is high.

Evaluation and Treatment of Infants During the First Month of Life

The diagnosis of congenital syphilis is complicated by the transplacental transfer of maternal nontreponemal and treponemal IgG antibodies to the fetus. This transfer of antibodies makes the interpretation of reactive serologic tests for syphilis in infants difficult. Treatment decisions frequently must be made on the basis of 1) identification of syphilis in the mother; 2) adequacy of maternal treatment; 3) presence of clinical, laboratory, or radiographic evidence of syphilis in the infant; and 4) comparison of maternal (at delivery) and infant nontreponemal serologic titers by using the same test and preferably the same laboratory.

All infants born to mothers who have reactive nontreponemal and treponemal test results should be evaluated with a quantitative nontreponemal serologic test (RPR or VDRL) performed on infant serum because umbilical cord blood can become contaminated with maternal blood and could yield a false-positive result. Conducting a treponemal test (i.e., TP-PA or FTA-ABS) on a newborn's serum is not necessary. No commercially available immunoglobulin (IgM) test can be recommended.

All infants born to women who have reactive serologic tests for syphilis should be examined thoroughly for evidence of congenital syphilis (e.g., Nonimmune hydrops, jaundice, hepatosplenomegaly, rhinitis, skin rash, and/or pseudoparalysis of an extremity). Pathologic examination of the placenta or umbilical cord by using specific fluorescent antitreponemal antibody staining is suggested. Darkfield microscopic examination or DFA staining of suspicious lesions or body fluids (e.g., nasal discharge) also should be performed.

The following scenarios describe the evaluation and treatment of infants for congenital syphilis:

Scenario 1. Infants with proven or highly probable disease and

1. an abnormal physical examination that is consistent with congenital syphilis,
2. a serum quantitative nontreponemal serologic titer that is fourfold higher than the mother's titer,[§] or
3. a positive darkfield or fluorescent antibody test of body fluid(s).

Recommended Evaluation

- CSF analysis for VDRL, cell count, and protein[¶]
- Complete blood count (CBC) and differential and platelet count
- Other tests as clinically indicated (e.g., long-bone radiographs, chest radiograph, liver-function tests, cranial ultrasound, ophthalmologic examination, and auditory brainstem response)

Recommended Regimens

Aqueous crystalline penicillin G 100,000–150,000 units/kg/day, administered as 50,000 units/kg/dose IV every 12 hours during the first 7 days of life and every 8 hours thereafter for a total of 10 days

OR

Procaine penicillin G 50,000 units/kg/dose IM in a single daily dose for 10 days

If >1 day of therapy is missed, the entire course should be restarted. Data are insufficient regarding the use of other antimicrobial agents (e.g., ampicillin). When possible, a full 10-day course of penicillin is preferred, even if ampicillin was initially provided for possible sepsis. The use of agents other than penicillin requires close serologic follow-up to assess adequacy of therapy. In all other situations, the maternal history of infection with *T. pallidum* and treatment for syphilis must be considered when evaluating and treating the infant.

[§] The absence of a fourfold or greater titer for an infant does not exclude congenital syphilis.

[¶] CSF test results obtained during the neonatal period can be difficult to interpret; normal values differ by gestational age and are higher in preterm infants. Values as high as 25 white blood cells (WBCs)/mm³ and/or protein of 150 mg/dL might occur among normal neonates; some specialists, however, recommend that lower values (i.e., 5 WBCs/mm³ and protein of 40 mg/dL) be considered the upper limits of normal. Other causes of elevated values should be considered when an infant is being evaluated for congenital syphilis.

Scenario 2. Infants who have a normal physical examination and a serum quantitative nontreponemal serologic titer the same or less than fourfold the maternal titer and the

1. mother was not treated, inadequately treated, or has no documentation of having received treatment;
2. mother was treated with erythromycin or other non-penicillin regimen;** or
3. mother received treatment <4 weeks before delivery.

Recommended Evaluation

- CSF analysis for VDRL, cell count, and protein
- CBC and differential and platelet count
- Long-bone radiographs

A complete evaluation is not necessary if 10 days of parenteral therapy is administered. However, such evaluations might be useful; a lumbar puncture might document CSF abnormalities that would prompt close follow-up. Other tests (e.g., CBC, platelet count, and bone radiographs) may be performed to further support a diagnosis of congenital syphilis. If a single dose of benzathine penicillin G is used, then the infant must be fully evaluated (i.e., through CSF examination, long-bone radiographs, and CBC with platelets), the full evaluation must be normal, and follow-up must be certain. If any part of the infant's evaluation is abnormal or not performed or if the CSF analysis is rendered uninterpretable because of contamination with blood, then a 10-day course of penicillin is required.^{††}

Recommended Regimens

Aqueous crystalline penicillin G 100,000–150,000 units/kg/day, administered as 50,000 units/kg/dose IV every 12 hours during the first 7 days of life and every 8 hours thereafter for a total of 10 days

OR

Procaine penicillin G 50,000 units/kg/dose IM in a single daily dose for 10 days

OR

Benzathine penicillin G 50,000 units/kg/dose IM in a single dose

Some specialists prefer the 10 days of parenteral therapy if the mother has untreated early syphilis at delivery.

****** A woman treated with a regimen other than those recommended in these guidelines for treatment should be considered untreated.

†† If the infant's nontreponemal test is nonreactive and the likelihood of the infant being infected is low, certain specialists recommend no evaluation but treatment of the infant with a single IM dose of benzathine penicillin G 50,000 units/kg for possible incubating syphilis, after which the infant should receive close serologic follow-up.

Scenario 3. Infants who have a normal physical examination and a serum quantitative nontreponemal serologic titer the same or less than fourfold the maternal titer and the

1. mother was treated during pregnancy, treatment was appropriate for the stage of infection, and treatment was administered >4 weeks before delivery; and
2. mother has no evidence of reinfection or relapse.

Recommended Evaluation

No evaluation is required.

Recommended Regimen

Benzathine penicillin G 50,000 units/kg/dose IM in a single dose^{§§}

^{§§} Some specialists would not treat the infant but would provide close serologic follow-up in those whose mother's nontreponemal titers decreased fourfold after appropriate therapy for early syphilis or remained stable or low for late syphilis.

Scenario 4. Infants who have a normal physical examination and a serum quantitative nontreponemal serologic titer the same or less than fourfold the maternal titer and the

1. mother's treatment was adequate before pregnancy, and
2. mother's nontreponemal serologic titer remained low and stable before and during pregnancy and at delivery (VDRL <1:2; RPR <1:4).

Recommended Evaluation

No evaluation is required.

Recommended Regimen

No treatment is required; however, some specialists would treat with benzathine penicillin G 50,000 units/kg as a single IM injection, particularly if follow-up is uncertain.

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Evaluation and Treatment of Older Infants and Children

Children who are identified as having reactive serologic tests for syphilis after the neonatal period (i.e., aged >1 month) should have maternal serology and records reviewed to assess whether the child has congenital or acquired syphilis (see [Primary and Secondary Syphilis](#) and [Latent Syphilis, Sexual Assault or Abuse of Children](#)). Any child at risk for congenital syphilis should receive a full evaluation and testing for HIV infection.

Recommended Evaluation

- CSF analysis for VDRL, cell count, and protein
- CBC, differential, and platelet count
- Other tests as clinically indicated (e.g., long-bone radiographs, chest radiograph, liver function tests, abdominal ultrasound, ophthalmologic examination, and auditory brain stem response)

Recommended Regimen

Aqueous crystalline penicillin G 200,000–300,000 units/kg/day IV, administered as 50,000 units/kg every 4–6 hours for 10 days

If the child has no clinical manifestations of disease, the CSF examination is normal, and the CSF VDRL test result is negative, some specialists would treat with up to 3 weekly doses of benzathine penicillin G, 50,000 U/kg IM.

Any child who is suspected of having congenital syphilis or who has neurologic involvement should be treated with aqueous penicillin G. Some specialists also suggest giving these patients a single dose of benzathine penicillin G, 50,000 units/kg IM after the 10-day course of IV aqueous penicillin. This treatment also would be adequate for children who might have other treponemal infections.

Follow-Up

All seroreactive infants (or infants whose mothers were seroreactive at delivery) should receive careful follow-up examinations and serologic testing (i.e., a nontreponemal test) every 2–3 months until the test becomes nonreactive or the titer has decreased fourfold. Nontreponemal antibody titers should decline by age 3 months and should be nonreactive by age 6 months if the infant was not infected (i.e., if the reactive test result was caused by passive transfer of maternal IgG antibody) or was infected but adequately treated. The serologic response after therapy might be slower for infants treated after the neonatal period. If these titers are stable or increase after age 6–12 months, the child should be evaluated (e.g., given a CSF examination) and treated with a 10-day course of parenteral penicillin G.

Treponemal tests should not be used to evaluate treatment response because the results for an infected child can remain positive despite effective therapy. Passively transferred maternal treponemal antibodies can be present in an infant until age 15 months. A reactive treponemal test after age 18 months is diagnostic of congenital syphilis. If the nontreponemal test is nonreactive at this time, no further evaluation or treatment is necessary. If the nontreponemal test is reactive at age 18 months, the infant should be fully (re)evaluated and treated for congenital syphilis.

Infants whose initial CSF evaluations are abnormal should undergo a repeat lumbar puncture approximately every 6 months until the results are normal. A reactive CSF

VDRL test or abnormal CSF indices that cannot be attributed to other ongoing illness requires re-treatment for possible neurosyphilis.

Follow-up of children treated for congenital syphilis after the newborn period should be conducted as is recommended for neonates.

Appendix 2

Key Informant Interviews: Complete Versions

I. Interview with the medical director of HHF:

Question: When did HHF start syphilis tests in the urban clinic? 10 years ago. Really they have always been available, but most people couldn't afford them. Now the ministry of health has changed it so that we receive money for doing syphilis tests. They are now free.

Question: How about in the rural zones?

This we started about 5 years ago. This we have to pay for. It is expensive—about \$1.50 a test.

Question: Do you see congenital syphilis?

Yes we do see some congenital syphilis, but not a lot. What we see more are stillbirths. We see stillbirths in women with syphilis.

Question: Why do you treat with only 2 doses of penicillin? What are the Haitian recommendations?

It is international standard. There are two categories, asymptomatic and symptomatic. For what we treat, mostly asymptomatic disease, 2 doses is more than enough. Really one would be adequate.

Question: Do you re-test women who are positive once they are treated?

The problem is that the tests we use in the village take a long time to lose their reactivity. So you may retest them after treatment and they may still be positive. Even if you retest them in a second pregnancy, they may still be positive. We see a lot of false positives I think because of this. Maybe sometimes it will go away quickly if it is only weakly positive.

Question: Why the drop in the syphilis rate from 2005 to 2006 in both the rural and clinic populations? Do you have any idea?

I have to see the statistics. Maybe there is an error in the way that they were entered.

Question: What are the nurses taught about syphilis testing? When should it happen? How often should it happen?

Women are supposed to get tested on the first visit. Really, it should be the first trimester, but women don't usually come at that time, so it's the first visit.

II. Interview with recent Haitian medical school graduate working at the COH:

There are many men and women with syphilis here in Haiti. I don't know a percentage, but there are many. Usually every day in the clinic we will have at least one woman test positive, and on a busy day usually 4 or 5. We give them 2.4 million units of penicillin—a one time dose. They get 1.2 million units in each buttock on the same day. They are counseled to bring their partner for treatment as well. Sometimes penicillin allergy can be a problem, and in that case we can use azithromycin or doxycycline for treatment.

Congenital syphilis does exist here in Jeremie. I've seen two cases in the last month that I've been here. This week, one woman was supposed to bring her child back for her second dose of outpatient PCN, but she did not. This particular baby had a rash on her hands and feet and body when she was born. So, she stayed in the hospital for 7 days and received 50,000u PCN/kg every day. She is supposed to get one shot a week for three weeks after she goes home from the hospital, but she has come back only once.

Here in Haiti babies of moms who have maternal syphilis are treated for congenital syphilis, regardless of whether they have symptoms. However, many times the mom will not want to stay in the hospital for the time that she needs to for the baby to receive treatment, and so the baby will not get it.

Often babies with congenital syphilis are asymptomatic, or they don't show any signs until later in life. However, the most common thing that you will see is a rash. It is a maculo-papular hyperpigmented erythematous rash that is classically on the hands and the feet, but also on the rest of the body. You can sometimes see neurologic symptoms, like the baby will be flaccid or floppy. However, not all of them will have this. Also, on x-ray their shins will be curved. These are manifestations of early syphilis in a baby. The later manifestations include malformations of the teeth, the palate, facial bones, and the shins. I have seen these cases in my medical school, but not here in Jeremie yet.

III. Interviews with HHF and KOMBIT Nurses

- A) Nurse 1: When a woman tests positive for syphilis in the villages, she receives one shot of PCN 2.5 million units immediately after she is found to be positive. She is educated about syphilis at that time. She is told that it is an infection and that it can cause damage. She could lose the baby, the baby can have skin problems, may have pus in their eyes, their bottom may be red, they can have a miscarriage, or the baby may be stillborn. They are then told to come back in 8 days to receive a second PCN dose and to bring their partner for treatment. Most women will return and will bring their partner, probably 90%, unless the man has gone to Port Au Prince and is not around. When the partner comes, he is educated about syphilis as well. He is told that he may get a chancre, can get secondary syphilis, or it may affect his heart. He is told that it can hurt him. Very rarely will a man refuse treatment. Very rarely will a man bring any of his other partners with him. He is told to let them know they may have the infection and should be tested and treated.
- B) Nurse 2: All women get a syphilis test, and they get 2 PCN shots. They get one, and then 8 days later, they are told to bring their partner and they get a second shot. Their partner is treated too. Almost all come back for the second shot with their partner. They get education. We do pre and post test counseling for syphilis. Even if they don't test positive, we tell them how to live and what to do so they don't get it. But here in Roseaux, it's different. Only 1 in 20 women test positive. It's less here. I think this is because people live closer to the clinic, so they are more educated about it and have better

care than if they are far away. They come to the clinic and hear a lot of things, and they know that they can get it from sex and what they need to do to keep from getting it. In other places they don't. Places that are farther away from Jeremie, such as Fond Bayard, have more syphilis.

If a woman tests positive, then I will treat her and then test her again to see if the treatment worked. It's rare to see a woman test positive on the second test, but if she did I would treat her again. Usually we just treat a woman once a year. But sometimes, if for example, the woman's husband lives in port au prince, then he may have other sexual partners. Thus, the woman might catch it again from the husband. When the partners come in, they are educated. Often, it is not the HHF nurse doing the teaching, though. I tell the staff here at the dispensary to give them education, and I tell them what to say. However, I don't stand with them, so I don't really know if they do it.

C) Nurses 3 and 4 together:

Question: Do you see a lot of syphilis in the villages? No, not a lot.

Question: Do you ever see congenital syphilis? No, we don't really keep track of the babies, just the moms. But we don't see any congenital malformations like one would expect to see from syphilis. We just see a lot of clubbed feet.

Question: Do you see babies with rashes when they are born? No.

Question: Do you ever test women twice for syphilis? Do you retest them after they are treated? No, we refer them to Jeremie if they are positive for more tests.

Question: On which visit do women get tested? They are supposed to get tested on the first visit, but this doesn't always happen. Sometimes the women are not available, or we don't have the things we need, so it doesn't happen.

Question: Why do you think women come so late in pregnancy for prenatal care? Some are far away and it's such a long walk and some just lack the education. I think cost is a big issue. They just don't have the money.

Question: What sort of educational topics do you teach the women before the clinics start? We teach them about breastfeeding, the foods they need to eat, the danger signs of pregnancy, and so on.

Question: Do you teach them about syphilis and other sexually transmitted diseases?

Yes

IV. Interviews with Community Health Agents

A) Community Health Agent #1:

This key informant had been working as a health agent in his village for approximately 4 years. He was eager to participate and very knowledgeable about his community.

He discussed the state of knowledge about syphilis in his village saying that people know some things about syphilis, but mostly only the signs, such as rash. He said that they know how to recognize it and that they get tested for it, but that is all. He tries to teach them about it at the posts and at the mothers groups.

When asked about how a partner reacts when a woman has syphilis, he said the following, “She tells him to come to the clinic and get treated. The men don’t feel like this is a terrible thing, like it is some grave disease. They just come here and we educate them about it and give them treatment. The men are happy to get the treatment once we educate them about it.” He says that he has not heard about anyone fighting about it or there being any problems in families because of syphilis. In further discussing partner treatment, the health agent said that partners are always treated and that sometimes he will go out and find the partner in the house and treat him if he does not come to the clinic.

In discussing syphilis education, he said that he teaches both the men and the women that syphilis can hurt a person or their baby inside. He tells them that they need to be treated and also need to bring their partners for treatment (both the men and the women), if they have any. If the person is married, he encourages them to be faithful to his/her spouse.

He admitted that he has seen cases of congenital syphilis in the past, and he recognizes them by the rash that they have. He refers them to Jeremie for treatment.

When asked why women often come late in pregnancy for prenatal care, he said that it’s only the women who come from a different zone that come late in pregnancy. In his zone, he makes announcements in the churches and schools so that the women know to come early in the pregnancy. It’s only the women who don’t know about it who come late.

B) Community Health Agent #2

This key informant has been a health agent in his zone for 9 years. He knows the population extremely well and was an excellent informant.

In talking about community knowledge of syphilis, he says that in his estimation 90% of the population knows that syphilis is a serious illness that needs to be treated. He teaches them about it at the mothers clubs. He says that they know it is a sexually transmitted disease.

He admits that there sometimes will be strife within couples after syphilis testing and treatment. “If a man knows that he’s been faithful, he will get angry at his wife or vice versa.” He’s never heard of any violence over it, however, and couples usually do not split up.

He says that he has seen babies with congenital syphilis. The babies have “swollen and pussy eyes, their bottoms are red, and the skin will peel on their bodies. They have a rash all over their bodies.” He’s seen a few cases in the last two to three years. He educates the mom and sends them to the nearest dispensary for treatment.

C) Community Health Agent #3

This health agent has been working in his village for the last 9 years. He discussed the relationship between magic and syphilis. “If a man thinks his wife is sleeping around, then he will go to a magician and put a ‘trap’ on the woman so that she has syphilis and gives it to her other lovers as well. These men can then also give it to their other lovers.” It’s harder for a woman to put a ‘trap’ on a man; men just do it better. So if a woman comes to the clinic and finds out she has syphilis, she may think that she’s had a ‘trap’ put on her. But she will usually only think this if

something else is going on, like problems in her relationship. Women often think of it in a more biomedical way too.

He says that there are sometimes arguments within a couple when the woman brings her partner for treatment. They think about whether the other person may be sleeping around. “There’s only one case that I can think of where it was really bad. The husband came to the clinic and was really mad. But after I explained things to him, and told him that they could both take the treatment and be healthy, he was not so angry anymore.”

He says that he has seen congenital syphilis in his zone before. “The child will be handicapped and will not develop well. He will be small and not grow well. He will have impetigo on his skin everywhere.” He has not seen it recently.

V. *Interview with local herbalist*

Question: Tell me about syphilis.

I haven’t seen a case recently at all. There hasn’t been very much of it in years. This is because of Penicillin. When they came with the Penicillin, it got wiped out. There used to be a lot of it here, and people would come to me to be treated.

Syphilis is an infection of the blood. People can get pimples that later dry and become black. For a week or two after that they can feel very sick and bad. If it’s not treated correctly or treatment is delayed people can get paralyzed. Both men and women can get a “heavy leg” that doesn’t work right.

Question: What is the difference between syphilis and blenoragey (Gonorrhea)?

They are extremely different. Blenoragey is an infection of “the canal”, but syphilis is an infection that gets into the blood. Blenoragey can be treated with herbs that cleanse the canal, but syphilis has to be treated with something for the blood.

Question: How does a person get syphilis?

When a man and a woman have intercourse, there is sometimes a little bit of blood. If the blood mixes with the semen, it can go back into the body and into the blood. It goes throughout the blood and distributes everywhere.

Question: What about blenoragey (Gonorrhea)? It’s carried by women and men. It also comes from intercourse, but it’s an infection of “the canal.” It doesn’t go into the blood.

Question: What kinds of treatment do you give for syphilis?

Since penicillin came around I just tell them to go to the doctor for their shot of Penicillin. Before that, I used certain leaves.

Question: What is the difference between Penicillin and the leaves?

My herbal treatment takes so much longer, like 2 to 3 months for them to get better. But Penicillin is like a miracle cure. Only 2 to 3 days and its gone.

Question: What kinds of leaves did you use in the past?

There are two different leaves that can be used as treatment “Boudon”, “Ci Frisse”, and “TPC”. You have to take them and grind them up in a fresh gourd every day. Then you have to cook them with water. It is like a tea. You drink the mixture cold. It has to be cold.

Question: Do the herbs go into the blood or stay just in the canal? Chi frisse goes into the blood TPC and Boudon clean the urinary tract. Chi frisse is like a natural penicillin. It just takes longer to cure syphilis.

Question: How about coconut milk?

It may help to clean out the canal, and people may use it, but it's not a cure.

Question: What about soap suds?

You are confusing it with gonorrhea, that's one of the treatments for gonorrhea.

Question: Why does the tea have to be cold?

Because you want to calm the urinary tract and to soothe the canal. The heat would aggravate the canal.

Question: I have heard people say that they can get syphilis from sitting on a hot rock or that a woman can transmit it to her baby by sitting on a cold rock if she is hot, is this true?

No, this is a man's excuse! It doesn't come from that, it comes from sexual intercourse.

Question: Does the heat or cold have anything to do with syphilis?

Well, when I lived in the Artibonite valley it was extremely hot there. I never saw any syphilis while I was there.

Question: Can syphilis go from mother to baby in her womb?

Yes, it's extremely dangerous if a pregnant woman has syphilis. They need to get Penicillin or the baby will die either inside the mom or after it is born.

Question: How does the syphilis get passed from the mom to the baby?

Her blood circulates all around and goes into the baby. The baby can get whatever sickness the mom has. Sometimes it can also happen in labor, because there is blood.

Question: Have you ever seen a baby with syphilis?

No

Question: What about blenoragey? (Gonorrhea) What is the treatment?

For this you can use leaves too. It takes 8-10 days to see them get better. Coconut milk helps too, because it makes you urinate a lot and it cleans the canal.

Question: What about yaws? (Pian)

I haven't seen any of that in many years. There used to be a lot. Children would get it. They would have terrible sores on their legs. They would get it from walking around with bare feet. They would have an open sore and it would get inside. But ever since there was penicillin, I haven't seen a case. I don't know. Maybe they've seen it in the hospital, but I haven't seen any around. I used to see it everywhere on the streets. The country is clean of it now.

Question: What about AIDS? Is it similar to syphilis?

Yes, they are both sexually transmitted. I've heard about AIDS but I don't know anyone close to me who has ever had it. If somebody came to me, I would try to treat them but I don't know how it would work.

Question: Is AIDS in the blood or in the canal?

It first is in the canal, but then goes into the blood.

Question: Have you ever seen teeth like these? (Picture of Hutchinson's Teeth Seen in Appendix 3)

Yes, but there is black in the center. It comes from bad water.

Question: Can a person get syphilis or AIDS from voodoo?

No, voodoo does not cause sickness. The bad type of voodoo can kill people. But that is a mystical thing. It does not make people sick. Voodoo can help to cure illnesses. I don't know why we haven't found a way to cure AIDS yet. I think that it's just that when people are in a trance, they are not thinking about things. So, they

forget about what they are thinking about. That is probably why we don't know how to treat AIDS.

Appendix 3

Nurse Picture Identification: Complete Responses



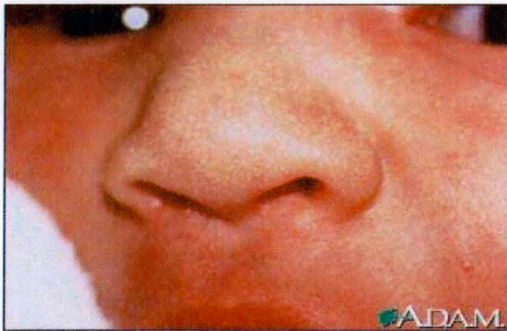
(Correct Answer: Congenital Syphilis)

Nurse #1: This is malnutrition

Nurse #2: Congenital syphilis.

Nurse #3: Its something called Chancre, they can get it from the teeth if there are many “pots” inside the mouth.

Nurse #4: Molluscum contagiosum



(Correct Answer: Milia)

Nurse #1 Well, I think it might be measles. It wouldn't necessarily look like this, but it might.

Nurse #2 Scabies, though this is a strange distribution.

Nurse #3 Scabies

Nurse #4 I don't know



(Correct Answer: Neonatal conjunctivitis from Gonorrhea)

Nurse #1 Congenital syphilis.

Nurse #2 Congenital syphilis. Or possibly from an infection, like gonorrhea that the baby gets when going through the birth canal.

Nurse #3 Neonatal conjunctivitis. It comes from a vaginal infection that the baby picks up as it moves through the birth canal.

Nurse #4 Neonatal conjunctivitis from an infection



(Correct Answer: Congenital syphilis)

Nurse #1 Congenital syphilis. If the mom had syphilis, the baby could get it and their bottom might look like this.

Nurse #2 Congenital syphilis. They can get a terrible diaper rash that looks like a burn.

Nurse #3 Reaction to the diapers or to the urine.

Nurse #4 Impetigo or possibly syphilis



(Correct Answer: Congenital syphilis)

Nurse #1 This comes from bad hygiene. Maybe the mom isn't washing the baby well. Or some people might say that if the mom gets upset, then the baby can get something like this.

Nurse #2 They can get this from contact with dirty clothes or dirty things. Its impetigo.

Nurse #3 Normal, when the skin "changes"

Nurse #4 Scabies



(Correct answer: Polydactyly)

Nurse #1 Malnutrition. The baby has a swollen arm, and this can come from Kwashiorkor.

Nurse #2 Kwashiorkor.

Nurse #3 Inflammation from a bite or an infection

Nurse #4 A congenital malformation. This can come from medications the mom takes during pregnancy, from Vitamin A, or from syphilis.



(Correct Answer: Congenital syphilis)

Nurse #1 Allergy or hives.

Nurse #2 I don't know, I would send them to Jeremie or the nearest dispensary.

Nurse #3 Scabies or an allergic reaction

Nurse #4 Scabies



(Correct Answer: Lanugo)

Nurse #1 The baby is born like this, and it will go away with time.

Nurse #2 It's a normal newborn baby.

Nurse #3 If a baby is fat and hot they can get yeast.

Nurse #4 Dehydration



(Correct Answer: Clubfoot)

Nurse #1 This is a congenital malformation. Some would say that it comes from falling during pregnancy.

Nurse #2 Clubfoot. It's a congenital malformation. You can get this from syphilis.

Nurse #3 Congenital malformation. Clubfoot. A baby can get this from the way the mom sits during her pregnancy, from her position.

Nurse #4 Clubfoot. A congenital malformation that can come from medications, vitamin A, or syphilis.



(Correct Answer: Congenital Syphilis)

Nurse #1 Comes from poor hygiene I think. But you can't really be sure, so we would send him to the hospital. There they would do blood tests for syphilis, HIV, diabetes.

Nurse #2 Congenital syphilis.

Nurse #3 I don't know what this is, but the baby should go for a blood test for syphilis.

Nurse #4 Maybe scabies



(Correct Answer: Stork Bite)

Nurse #1 Heat rash

Nurse #2 Congenital syphilis. There are a lot of different kinds of rashes you can get with congenital syphilis.

Nurse #3 Allergic reaction

Nurse #4 Skin infection from the heat



(Correct Answer: Rash of Congenital syphilis)

Nurse #1 The baby can get this from teething. Or it can be something that the mom has and the baby gets it from the mom if they wash their clothes together.

Nurse #2 Congenital syphilis.

Nurse #3 I don't know what they come from, but sometimes babies will get pimples that go away after a few days.

Nurse #4 Skin fungus

Appendix 4

Focus Groups: Complete Versions

Group 1: Pregnant Women at Rural Prenatal Post

This focus group was composed of three women present for care at a prenatal post. The first woman was 7 months pregnant, the second 5 months pregnant, and the third was 4 months pregnant. They all had had previous pregnancies for which they were seen at the prenatal post. All women participated actively in the discussion.

These women recognized that they had two blood tests at the post during their pregnancy. One was for anemia, and the other [the syphilis test] was “to see if you have any sicknesses.” They admitted that they had heard of syphilis before from the staff at the prenatal post. They believe that syphilis can cause ulcers, a rash, and “hemorrhage.” They did not know where it comes from or how people get it. They did not know of any treatment for it, and had heard from people in the village that it is untreatable. When asked if they had ever known anyone with syphilis, one woman told the following story: “There was a lady in our community who had syphilis. She kept getting pregnant, but the babies kept dying inside of her. This happened many times. Then she came here to the prenatal post and they sent her to Jeremie to be treated [for syphilis]. Now she has a living child.”

Group 2: General Women’s Group

This focus group was composed of 5 women. They ranged in ages from 26 to 52 years old. One woman had never had children, and the others had children before. They were approached while they were working together to cook an evening meal for a group of guests. They were all eager and willing to participate. The younger women were quieter and had to be drawn into the discussion, while the older women expressed strong opinions about the matters at hand.

The women collectively listed vaginal infections, AIDS, smelly vaginal discharge, trichomonas, and gonorrhea as sexually transmitted diseases. They said that when a person gets one of these infections, they get a “mikrob” or a bad germ inside the vagina. They said that syphilis is an infection with one of these “mikrobs”. It gets into a person’s body and gets into their blood and then makes the person itch. Some of the women suggested that a man gets syphilis from “sitting on a hot rock”. They recognized the symptoms of syphilis as being vaginal itching and a discharge. Also the woman may have a bad skin eruption. A guy will know that he has syphilis if he has a discharge in his underwear.

The women knew of a couple of different treatments for syphilis. One woman said that people should only go see a medical doctor for treatment. Others described herbal or folk remedies for the illness. One woman described a leaf “Barikad vole” (Barricade the thief) that a woman is to make a tea out of and drink all day long every day until her vaginal discharge clears up. Another woman told about a treatment for syphilis she had heard of as a child. “Old people, when they have syphilis, take a bar of white soap that they wash clothes with, they beat it with water and make soapy froth. They drink it to cure syphilis. They also need to drink a lot of coconut juice.

These are consumed cold, never hot.” Those that thought medical treatment is necessary recognized that antibiotics are the cure for syphilis. They felt that ampicillin and amoxicillin are good medications for a woman with syphilis. They said that the treatment for a man is different. There are no herbal remedies for a male, and he must go to the medical doctor and get antibiotics. Possible regimens for the man were listed as “a shot” or ampicillin, amoxicillin, and tetracycline (all three taken together). All women agreed that local application of medication in the vagina would not cure syphilis.

The women believed that a mother can transmit syphilis to her baby during pregnancy. They suggested that the transmission occurs when a woman walks a long way and is hot, and then she sits on a cold rock. According to these women, if a baby has syphilis his/her skin will be “pinched” and in bad shape. His/her eyes will also be “different”, and his/her head will always have sores on it.

Group 3: Center of Hope Prenatal Group

This group involved six pregnant women that were waiting for prenatal care outside of the Center of Hope. The group was composed of women of a range of ages and with a range of number of previous pregnancies and current time in gestation. They were all pregnant at the time of the interview and had received care from the Center of Hope. Some came from villages where there are health agents and others did not. Thirty year old E was from Jebo and was 7 months pregnant. She has 3 other children at home. Y was 16 years old and came from Jebo. This was her first child. Thirty-two year old D was 9 months pregnant. She had 3 other children at home and came from Latiboliaire. Mi was 9 months pregnant and 32 years old. She came from Boyer and had two other children. P was 33 years old and came from Boyer. She was 6 months pregnant and had two other children at home. V was 4 months pregnant. She came from Carffour Sanon and was 30 years old. She had 3 other children.

Question: What diseases can be transmitted through sex?

AIDS, syphilis, herpes, gonorrhea, other infections

Question: What is syphilis?

It's a sickness where you get rashes and lots of skin manifestations. Both men and women can get these marks on the skin. Women will have a vaginal discharge. Women will get PIJ (a vaginal discharge that a woman has after she gives birth) when they have syphilis. A man will have skin manifestations as well.

Questions: What can an herbalist do for syphilis?

Nothing, you have to go to the doctor. The doctor has to consult you and you have to get antibiotics.

Question: What kind of antibiotics?

Amoxicillin, ampicillin, tetracycline

Question: If you break open a tetracycline pill and put it in your vagina, will this help with syphilis?

No.

Question: How about a vaginal suppository?

No, you have to drink the antibiotics.

Question: How about herbs or tea?

No, these wont help.

Question: What happens if you have syphilis and it is not treated?

You will die. It will putrefy your birth canal.

Question: Does syphilis stay in your vagina or get into your blood?

One woman said it stays in the vagina, another said it goes into the blood. Both AIDS and syphilis are in the blood.

Question: When a woman has syphilis, how does she know she has it?

Her vagina will itch, and she will get a skin eruption.

Question: What treatment is there for men with syphilis?

The same as women.

Question: Does a man give syphilis to a woman or a woman to a man?

It goes both ways.

Question: What is syphilis?

It's a mikrob.

Question: How can you prevent syphilis?

To just have one sexual partner.

Question: Is there any other way?

Yes, to use condoms.

Question: With just the first woman or all of them?

With all of them. Both the women inside the house and outside of the house need to use condoms.

Question: Can syphilis hurt a baby if a mom has it while she is pregnant?

The baby can be born blind. The same way that syphilis makes us sick in our vaginas, it can make the baby sick in her vagina. Whatever is circulating in the mom's blood can go the baby's blood.

Question: How about gonorrhea?

Yes.

Question: Can syphilis be transmitted through the breast milk?

No, but if a woman has a sinus infection that can go through the breast milk.

It's the blood that makes the baby grow not the milk. So the baby's get the sickness from the blood.

Question: Are there any other sicknesses that a baby can get from the breast milk?

No.

Question: Is herpes in the blood?

Yes, all infections are in the blood.

Question: Are AIDS and Syphilis similar?

No, there is no treatment for AIDS but there is one for syphilis.

Group 4: Masons and Laborers

This was a focus group composed of 5 masons and laborers. They were doing their daily work when they were asked to participate. All were willing to participate and verbal consent was obtained. All members of the group participated, though the younger men were more timid and allowed the older men to speak more. The group leader encouraged participation from all group members.

The members of the group were as follows: A 41 year old man who is legally married with 5 children, a 17 year old young man without any children, an 18 year old young man with no children, a 32 year old man with 3 children, and a 24 year old male with no children. None of these men have been part of a youth group in the past. Some of the men volunteered that they had been tested for syphilis before and that they were all negative. One said that he got the test before marriage, because it is compulsory for legal marriages.

The group collectively named AIDS, syphilis, “another illness in your blood,” an illness where the “inside of your penis gets hot”, and “Grand chaleur” and “eculma” (both words for Gonorrhea) as sexually transmitted infections.

They said that both men and women can get all of these illnesses, and they are not specific to males or females. There is no illness that affects only the vagina or only the penis.

They said that syphilis is a contagious illness. One person said that it can make you “mankesan” a word meaning anemic, or not having enough blood, thin, frail, and “soft”. He also said it can make you cough, feel short of breath, and lose weight. Others said that it can make your skin itch, make you feel tired, or simply not feel the same.

They believed that if a person has syphilis, then he/she has to go to the doctor to be treated. They did not know exactly what medication it is treated with, but one person suggested a salicylate. He says that the salicylate has to be rubbed on the skin, and it will make the person hot and sweaty, and this will help him get better. They admitted that some people will go to an herbalist for syphilis, but herbal treatments are only temporizing. One has to go to the medical doctor to be cured. If syphilis is not treated, the person will die.

When discussing the similarities between AIDS and syphilis the group agreed that untreated syphilis leads to AIDS. Some thought that syphilis and AIDS are the exact same diseases, and others differentiated them somewhat saying that if a person has syphilis he can go longer without symptoms if he is not treated. However, if a person has AIDS, this kills him very quickly.

They recognized that a woman can transmit syphilis to her fetus, and that she has to go to the doctor to be treated. A baby that has syphilis will be cranky, colicky, will have bad, itchy, “pinched”, skin, and the baby may be born preterm.

In discussing folk ideas about STI’s, the men admitted that they had heard that one can send AIDS as a curse supernaturally, “but I’ve never seen any proof that this is true.” They did not believe that syphilis could be sent by magic. All of the men heartily agreed that a man gets gonorrhea from “sitting on a hot rock.”

Group 5: HHF nurses

This was a group interview held with HHF nurses (approximately 20) of varying ages and levels of experience. They were present at the monthly staff meeting. The focus of the group was why syphilis tests are sometimes not done or are deferred for many visits. The interview process was explained to them and verbal consent was obtained.

Question 1: What are some of the reasons why a syphilis test might not be done?

Simply professional negligence! Sometimes we don't have the time. Sometimes we do it, but we only write it on the woman's personal health card and not on her prenatal file. Sometimes it's the opposite; it's on the prenatal file but not on her personal health card. Sometimes we don't have the tests.

Question 2: Why don't you have the tests?

Well, HHF has them, but sometimes we just don't bring enough out to the field with us. Oftentimes we don't know how many pregnant women are going to come to the post. Or occasionally we forget to bring them altogether. Professional negligence! If it happens for one visit that's one thing, but if it's deferred for more than one visit this is a problem. Sister Mary used to be cautious about giving us a lot of tests.

Continued discussion about Question 1:

Sometimes the women can't pay for it. But if that happens, I tell them that I will pay for them and they are then usually able to come up with the money after I say that. The payment issue is better now, though. It used to be that a woman had to pay separately when she got the blood tests. She would have to give 25 Gourdes (~65 cents) at the time that she was getting the blood tests. Now every woman pays 25 Gourdes as a flat fee for every visit. They pay it at the registration desk. The fee includes anything that happens at the visit—the consultation, blood tests, and any medications she needs. We started doing this in July of 2006, so I think that you will see that the testing rates were higher after that point. Most women are able to pay this, but some can't. But even if a woman comes with 10 Gourdes, we will take the 10 Gourdes and still give her the care that she needs. Sometimes we will pay for them ourselves.

Question 3: What happens if you don't bring enough tests out to the field? How do you choose who gets tested?

One person: The first priority is those women who come in the 9th month that will deliver soon. Another person: No, the first priority is the women in the first trimester on the first visit. This is the protocol. Third trimester is not the priority because the baby will already have the sickness and it won't help anyway. Another person: I would make the first priority a woman who has had a lot of miscarriages or stillbirths in the past.

Question 4: What is the second priority then?

Well, then we look at people we think might have the disease. Maybe they have a skin eruption.

General comment: I think that you will see a change in the number of women tested. We have made some recent changes, such as the change in the payment, and also we now have one person in charge of all of the tests, and also we have appointed one person to be in charge of keeping all of the records for the women who are positive that we send in to Jeremie for a true RPR and an HIV test.

Appendix 4

Education Cards for Pre and Post Test Counseling

Syphilis Pre-test Counseling for ALL Women:

- 1) Syphilis is a sexually transmitted infection
- 2) Syphilis can cause symptoms in both men and women such as:
 - a. A painless ulcer on the penis or in the female genitals
 - b. A rash all over the body
 - c. Dangerous heart problems
 - d. Weakness or lack of feeling in a body part
- 3) A person can have syphilis and have no symptoms
- 4) Syphilis can harm the baby inside of you
 - a. It can make a baby die inside the womb
 - b. It can make a baby be born too early or be born dead
 - c. It can make a baby sick after birth or the baby may die
- 5) Syphilis is treatable with a few injections, and then you won't have it any more and the baby will be protected
- 6) If your test is positive, we will treat you and ask you to bring your sexual partner for treatment so that if he has it, he won't give it back to you again

Syphilis Post-test Counseling if Negative:

- 1) You do not have syphilis
- 2) You can still get syphilis in the future
- 3) You can help protect yourself from syphilis by:
 - a. Having just one sexual partner
 - b. Using condoms with your sexual partner
- 4) If you get pregnant again, you need to be tested for syphilis again. It is best to be tested early in the pregnancy. You should come to the clinic as soon as you think you are pregnant.

Syphilis Post-test Counseling if Positive:

- 1) You have syphilis
- 2) Syphilis is treatable with a few injections (explain injection schedule). Once you receive the injections you will be cured and your baby will be protected.
- 3) You got syphilis during sex.
- 4) You need to bring your partner to be treated. If you do not bring him, you may get the sickness again from him during sex once you are cured.
- 5) You can still get syphilis again in the future, so you need to protect yourself by:
 - a. Having just one sexual partner
 - b. Using condoms with your sexual partner
- 6) We will refer you to Jeremie to get another blood test for syphilis and also for HIV, another infection people can get through sex
- 7) If you get pregnant again, you need to be tested for syphilis again. It is best to be tested early in the pregnancy. You should come to the clinic as soon as you think you are pregnant.